The Builder.

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IN preceding volumes of our journal we have spoken at some length on the subject of architects' charges, with the view of removing some of the doubts felt on the question, and of inducing consistency, if not uniformity of practice, in this respect.* We invited members of the profession to favour us in confidence with a memorandum of their customary charges, and any remarks that might occur to them, hoping thereby to settle some questions conclusively; and we looked forward to a report on the same subject from a committee appointed by the Institute of Architects to inquire into various points of professional practice. Our hope of a useful result was disappointed in both cases: all who wrote to us were inquirers, not communicants; and the committee of the Institute, who seem to have found the same difficulty in obtaining knowledge of the practice of any number of architects, did in reality very little, and thought it better not to publish the result of their inquiries or any opinions on the matter. It was stated in the annual report,—that "they found the most perfect unanimity to prevail amongst the members on all the more important questions connected with the practice of the profession; on the liabilities and responsibilities of architects; and as to the usual and accustomed remuneration for their services under different conditions. The information thus obtained, and embodied in the minutes of the committee, and available for the use of the members in general, will, it is presumed, be peculiarly valuable on occasions when questions may be submitted to the council for their consideration and advice, as they will now be enabled to deliver opinions with the weight and authority of the profession in general, as represented by the Institute, instead of, as heretofore, merely expressing the opinion of individual members."

We took occasion to complain of this proceeding, and urged that, as it was equally important that the public should be informed on these points as that architects should know what others charged, the council should publish a well-considered report on the subject, and not shrink from asserting their own position and claims.†

They have not done so, and the question remains in the same unsettled position as ever. Whether or not the council do receive inquiries as to what charges should be made, to which they give answers having the weight and authority of the profession in general, we cannot say; but certainly *we* still constantly have queries forwarded to us with lamentations over the fact that they are charging in the dark, and, what is worse, that, charge what they may, their employers always seem to think they have the right to object and quibble.

A few weeks ago we inserted one inquiry which is often made to us, in these words:—"In the case of a building not erected by contract, but where, in addition to his customary duties, the architect will have to measure and value the works on their completion, is he entitled to any and what compensation in addition to the ordinary charge of 5 per cent.?"

A difference of opinion exists respecting this. Mr. Joseph Bonomi, who printed his terms in 1794, charged 5 per cent. commission upon the whole expense of the building, labour, and materials, at London prices; for which, to use his own words,—"B. makes the design, furnishes all the necessary working drawings, and four fair drawings, two plans, one front, and one section; makes the necessary estimate, and attends the execution of the work. If a clerk of the works is required (as he should be), he is to be paid by the employer. All the journeys to and from to be paid at the rate of 18d. per mile. If the expense of the building exceeds the estimate given, then B. demands no more than the commission upon the amount of the given estimate, provided, though, that the overplus is not caused by additions and alterations in the design. If it should be desired, after the building is completed, to have it measured and valued, the *expenses attending such measurement and valuation are to be paid by the employer.*"

In the evidence appended to the report of a Select Committee of the House of Commons, appointed in 1828, to inquire into the working of the office of Woods (one of the few documents which can be quoted on the subject), Sir Jeffrey Wyatville states, that in his extensive practice he always received 5 per cent. commission on the expenditure, and *the expense of measuring besides*: he also charged for his journeys. Mr. Henry Harrison, however, on the contrary, said that 5 per cent. was the usual commission, *including* the measuring and making out the several accounts; and the Surveyor-General, in a report dated 1826, stated that Messrs. Soane, Smirke, Cockerell, and others had not in their practice made any charge for measuring the works they have been employed upon, considering this expense to be included in their commission of 5 per cent. Mr. Nash, at Buckingham Palace, received 5 per cent., the Board of Works undertaking the measuring and making out.

What is wanted, however, is the practice of to-day, not of 1826; and this we are disposed to think would be found not uniform. The Committee of the Institute, if we are rightly informed, considered that no extra charge should be made for measuring, if the works were not under contract: that the 5 per cent. should include the design, the specification, general estimate, working drawings, superintendence of the works, and the adjustment of the accounts.

In large works this would prove sufficiently remunerative, but in small works it certainly would not: an additional 1½ per cent. at least should be charged for making out the accounts.

For measuring and making out extras and omissions from a contract, no extra charge should be made beyond the commission of 5 per cent. on their amount; but this commission may fairly be charged on the amount of *both*,—provided (to reverse Bonomi's words), the overplus is not caused by the forgetfulness, inattention, or ignorance of the architect.

We are not strongly wedded to the system of payment by commission, but see no better mode of managing it. Apart from the ground it gives for unjustly charging architects with a desire to swell the expenditure as much as possible, there is this real objection to the mode, that an individual's ability or standing in the profession goes for nothing. As we remarked some years ago,—"Mr. Brown, Jones, (no Inigo perhaps), or Robinson, who makes drawings and superintends the erection of a huge warehouse, costing 10,000*l.* or 15,000*l.*, and Mr. William, of Wykeham, who designs and carries out a gem of a chapel, with an expenditure of a tenth of that sum, are paid very differently by this system; the latter might require scores of drawings where the former needed one, saying nothing of the higher order of mind exhibited, while the remuneration would, of course, be but a tenth part." Not that a true artist—one who loves his profession—would ever think of this, or hesitate a moment between two such works if the choice were offered to him; still this is the pounds-shillings-and-pence state of the case, and does not seem to be wholly correct.

In reply to some other inquiries, we would say that the commission on works by contract "where there is a ruinous difference in amount between the highest and lowest" may be fairly charged on the mean of the whole, and that the value of old materials applied in the new works (the lead for example on a church roof contracted to be restored) should be added to the sum on which the commission is charged.

On more than one occasion we have been asked to say to what extent an architect is liable for orders given to builders. We believe we are correct in saying that an architect is in the position of an agent, and that if, in giving his order, *he names his principal*, no personal responsibility is incurred.

Once more we urge the Institute of Architects to go fully into the inquiry, and to publish a clear and comprehensive report on it, for the information of the public and the guidance of the profession.

* See vol. iii., p. 605; vol. iv., pp. 21, 61, &c.
† See vol. iv. p. 325.

ON GRECIAN ARCHITECTURE.*

IN two preceding lectures which I have had the honour to read before the College, we traced the rise and progress of architecture from the earliest periods of the world, through the patriarchal ages, discoursing of all that could be found to illustrate the subject in sacred history. We then came to the consideration, as closely connected with the destiny of the Hebrew nation,—of one of the oldest countries in the world,—of one, which, though changed in its language, its observances, and its religion, yet retains its grand and imposing memorials of architecture: in its pyramids, no longer the tombs of their once mighty builders; in its majestic and solemn temples, no longer frequented by the deluded worshippers of a heifer, or the believers in the divinity of a bird, a fish, or a reptile.

We, indeed, only glanced at the architectural wonders of Egypt in speaking of that ancient country, nor is it intended now to enter into a detail of the style of its temples, highly interesting as the inquiry would prove, beyond the necessity of shewing an intimate connection between the architecture of Egypt and that of Greece, to which the present lecture will be chiefly devoted.

When we find that some of the most celebrated men in Grecian story travelled into Egypt, as Homer, Pythagoras, Lycurgus, Solon, Herodotus, Plato, and many others, that much of Egyptian lore was, therefore, introduced into the legislation, the poetry, and the religion of the Greeks, we must not be surprized to find also that their architecture was in some measure derived from the same source, from that country, in fact, which, in the days of Cecrops as in the age of Moses, had the reputation of being the wisest, the most refined, as well as the most skilful of nations. The great divinity of the Athenians—the virgin-goddess and protectress of their city—was Egyptian; and not only Minerva, but many of

* Read at a meeting of the Freemasons of the Church on the 13th of June, the Rev. G. Pocock, LL.B., in the chair.

the personages of the Greek mythology, can be traced to the land of the Pharaohs.

It has been a fashion with some writers, following the example of an ancient author, to derive classic architecture from timber construction. I confess that to me the connection is not sufficiently made out; it is not carried through in a clear and satisfactory succession; links are wanting, and can never be supplied in the chain of evidence; the fancy is appealed to at the expense of sober reason, and hence I cannot perceive the resemblance between a temple of Minerva and the hut of Pelasgus.

The "sylvan hypothesis" has been actually revived within the last few days, for in a work recently published we find this announcement —"To deny that the purest ecclesiastical Gothic exhibits the most striking similitude to the interlacing of groves and trees, as well as to the construction of wicker-work, were as unreasonable as to shut our eyes to the marked analogy between the Grecian Doric temple and the wooden hut."* The refutation of the former part of this opinion, the revived dogma of Warburton and Sir James Hall, may be safely left to our excellent secretary, to whose work on "Ancient Gothic Churches" our society must rejoice to find that ample justice has been accorded: it is to the latter part of this revived but untenable opinion that my present observations will apply.

We offer no violence to our convictions if we admit the obligations of the Greeks to the Egyptians in architecture, if, knowing how much in all other respects the former were indebted to the latter, we also acknowledge that they did not disdain to derive from that ancient people much, at all events, to serve as hints in the arts of construction.

Instead, therefore, of forced attempts to plan a pure Greek temple, with all its details, upon the hypothesis of its prototype being found in trunks of trees ranged in rows, with beams and cross-beams representing architraves and triglyphs, aided, moreover, in the working out from other sources that which could not be obtained in types of vegetable nature, by giving to one order the proportions of a man, to another that of a female; yet, strange to say, in these the plan of nature is reversed, for the manly example is shorter than the womanly type,—instead of these unsatisfactory theories, let us turn to actual experiences of art yet existing before our eyes, in which we shall find evidences too strong to be resisted of the true origin of Grecian architecture.

One of the earliest arrangements of the Greek temple was, without doubt, that which has in front the portico in Antis, that is, the columns are placed between pilastrated ends of the flank walls, consequently such temples were not peripteral, as was commonly the case in later times. This was the usual arrangement of the temples in Egypt: there is not, to the best of my recollection, an example known of a peripteral temple in that country; and thus the resemblance is very striking that exists between the Greek temples of Themis at Rhamnus, of Diana at Eleusis, and those at Hermonthis, and Tentyris, in Egypt. We may here observe that the strange and appalling mysteries of Ceres, observed in her temple at Eleusis, were of the same nature, and derived from those of the goddess Isis, which were practised in the Egyptian temples. As trees do not grow square, we certainly can find no types in them of the antæ, which are, in truth, the natural terminations of the walls.†

No derivation merely from the trees of groves could suggest an arrangement of the plan of a temple, but we find in many respects the Greek temples resembling those of Egypt. In each there was the same precaution taken to exclude the profane crowd; in each the inner sanctuary or shrine of the divinity was to be approached only by the privileged few, the appointed and hereditary guardians of the fane; and probably every sacred building in Greece, had, like those of Egypt, its peribolus, or sacred wall of enclosure, to prevent the too near access of the uninitiated; for in nearly every known example of a temple, traces are discovered of this surrounding wall. Again the same determination to throw a veil of secrecy and solemnity over the religious observances, caused the sacred buildings in both countries to be alike deficient in light, to be alike in their interiors involved in the gloom and mystery so favourable and so necessary to carry on deception; and consequently we hardly ever find an equivalent for windows in temples, for in almost every instance the light was only admitted through the portal.

Little is known concerning the Eleusinian mysteries, as the initiated were obliged to contract a solemn engagement to observe secrecy, and those who revealed their knowledge were looked upon as profane wretches, with whom it was not safe to hold any intercourse; thus Horace exclaims (Od. ii. lib. iii.)—

"Beneath one roof ne'er let him rest with me
Who Ceres' mysteries reveals;
In one frail bark ne'er let us put to sea,
Nor tempt the jarring winds with spreading sails."*

Again the absence of everything like timber construction is seen in the closeness with which the columns are clustered together; in both countries this feature is remarkable, the result entirely of stone and not of timber combinations, for a beam of wood will span a much larger opening with safety than can be attempted in stone, and we must also recollect that Egypt had no timber-trees. But what do we find in her architecture, but constantly recurring imitations of her natural productions as will presently be seen; but whilst these are introduced in the way of ornamentation, no trace can be found of their adoption as hints for construction, for which indeed their fragile and yielding forms would be quite inappropriate.

Having thus far noticed the absence of every thing like timber construction in Egyptian buildings, let us proceed to ascertain how far an imitation of nature *did* prevail in the details. The fact is too clear to admit of the slightest doubt upon the point, that Egyptian columns were only enormous bundles of the reed or bulrush of the Nile, tied together at intervals by bands of twigs, exactly after the manner of the hoops of a beer-barrel. We need not travel to Egypt itself for proof; we have only to go as far as the British Museum, where we shall see a column of dark granite, which is an imitation of reeds banded together, and the capital has a remarkable likeness to that of a Grecian Doric column:—a flat tile, the abacus of all nations, pressing strongly upon the supporting column, which is tied closely round the neck, near the top, has caused the reeds to bulge out, almost in the very form of the Echinus. This peculiar shape of capital is very common in the temples of Egypt, and may be considered, if I may use the expression, as the Doric example of that country, as the capitals which have the heads of Isis may be called the Ionic exemplar, and those which have foliated copies of the palm and lotus may be looked upon as the Corinthian specimen; and I am inclined to find in these varieties the real origin of the Grecian, Doric, Ionic, and Corinthian, rather than in the pretty, but baseless fables of matronly ringlets and virginal baskets: and here we may observe, in refutation of the opinions which would ascribe the invention of two, at least, of the three orders to persons bearing certain names like them, that the profoundest Greek scholar of the day, the Bishop of St. David's, considers "Æolus, Dorus, Achæus, Ion, to be merely fictitious persons, representations of the races which bore their names." (Hist. of Greece, vol. 1. p. 107.) Thus another favourite dogma falls to the ground.

It surely cannot be considered as too great a tax upon our understanding, to believe that among the travellers who resorted to Egypt as the great nursery of the arts and sciences, in addition to the poets, philosophers, and legislators, who flocked thither to imbibe lessons of wisdom and instruction, there were also those who would be impressed with the majesty, the vastness, and the execution of the temples and monuments of the country, who would also, on returning to their own land, then only emerging from recent barbarism, seek to introduce imitations of what had appeared to them so grand, so beautiful, and so worthy of adoption.

Nay, we may be inclined to think that the earlier structures of Greece, of which not one vestige now remains of consequence, the temples which existed before the Persian invasion, may have been built very closely after the Egyptian manner, with much of that stiffness and formality and want of grace which marked alike their architecture and their sculpture; and we know that in the latter art, the productions of the early sculptors of Greece, were of a most rude and primitive character.

So many of the Egyptian ceremonies and customs were received at Athens, that it is not to be wondered at, in the city founded by the Egyptian Cecrops, that one of their writers upbraids the Athenians that "They had made their city to be Egypt instead of Athens."—"But," to use the words of one who has written so admirably of Greek taste that it is impossible to express the sentiment with more force than in the language of the noble writer, Lord Aberdeen, "in thus mentioning the obligations of Grecian architecture to the practice of Egypt, the statement must be understood as limited to the mere mechanism of the art, and not as intended in any degree to detract from the just claims of the Greeks to originality:—if indeed the discovery of all that is admirable, of all in which its beauty and attractions consist, can sanction such a claim, we may safely place this art among those which they most distinguished by the fertility of their invention, as well as by the unparalled beauties of their execution."

Another author, Heeren, has, in one sentence, expressed a volume of just criticism:—"What the Grecian touched became gold, though it had before been of baser metal." (History of Ancient Greece, p. 45.)

In the early ages, men had neither temples nor statues for their gods, but worshipped towards heaven in the open air, and chiefly on elevated spots, of which we find such frequent mention in sacred and profane history. The Persians in particular, even in times when temples and statues were common among other nations, had none, "not thinking," says Herodotus, "the gods to be of human shape, as did the Greeks;" and to this difference of opinion we may ascribe the motive of the monarch Xerxes, in burning and destroying the temples of Greece, against which his anger was particularly directed, for Cicero tells us that the Persians thought it absurd to confine the gods within walls "whose house and temple was this whole world,"—"quorum hic mundus omnis templum esset ac domus."—*Lib. II. De Legibus.*

How finely does Æschylus, the warrior bard, who had distinguished himself so greatly in the glorious battles of Marathon, Salamis, and Platæa, make the ghost of Darius, in the drama of "The Persians," ascribe their defeat as a just recompense for having profaned the temples, and

"in vengeance for their proud
And impious daring: for where'er they held
Through Greece their march, they feared not to profane
The statues of the gods; their hallowed shrines,
Fired from their firm foundations, to the ground
Levelled their temples."

But, like the fabled Phœnix reviving from its ashes, Greece arose from amidst the desolation of her hearths and the destruction of her altars, with a splendour and purity of architecture such as the world had never seen, and after the signal and glorious revenge which the Greeks obtained at Salamis, Platæa, and Mycale upon the myriads of their invaders, and when the Persian host had turned their backs for ever upon Greece in flight and disgrace, the Athenians had breathing-time to turn their attention to the restoration of their beloved fatherland, and the rebuilding of their desecrated and ruined temples.

It was fortunate for Athens, that at this era two men flourished among her denizens, to whom that city, and indeed the whole world, was so greatly indebted for directing the public taste in the right channel.

The conclusive defeat of the Persians occurred 480 B.C., and "after these times," says Diodorus (b. xii.), "for the space of fifty years Greece received a great increase of prosperity, for, in these times, the arts, by means of the

* "Ancient and Modern Art, Historical and Critical; by George Cleghorn."

† When Leontychidas, king of Sparta, visited Corinth (490 B.C.), on seeing the ceiling of the house in which he was staying ornamented with sunk panels, he asked his host f the trees in Corinth were naturally four-cornered?

* Socrates, Diagorus, Æschylus, and Alcibiades, all incurred disgrace and danger for speaking too freely of the mysteries of Ceres.

affluence which prevailed, were advanced, and the most renowned artists flourished."

The conqueror at Mycole, Xantippus, head of the illustrious family of the Alcmæonids, whose wife was a descendant of the famous Cleisthenes, was the father of one who, distinguished as he was for birth, for valour, and wisdom, was no less so for the control he exercised in matters of the highest art and taste. This was Pericles, whose name cannot be mentioned without honour,—a name before which that of a Mecænas or a De Medicis must give way, high as those great men deservedly rank for their support of the true and beautiful in art as well as in science.

But the generous patronage, the high-souled taste, the munificent love of art of a Pericles, would have availed but little without the corresponding energy, the unrivalled genius, the sublime conceptions of a Phidias.

To these two great men, inseparable in their well-earned immortality as they were in their life-long friendship, is the world indebted for the most perfect specimens of architecture ever produced, whose influence has for more than 2,000 years been felt in every civilized country.

We must not look upon Phidias only as the great sculptor,—the greatest, perhaps, that ever lived,—but he seems to have had the designing, and certainly the direction, of all the vast works projected by Pericles. Thus Plutarch in his life of that statesman says, "It was Phidias who had the direction and superintendence of all these works for him, although great architects and excellent workmen were employed in erecting them."

That one of the architects engaged upon the Parthenon, viz., Ictinus, was an artist of consummate skill and taste, we are quite certain from the knowledge we have of another work of which he was the sole architect, namely, the Temple of Apollo Epicurius, at Bassæ, in Phigaleia, in which it does not appear upon record that Phidias had any share in the design, although the sculptures which belonged to it, illustrating the favourite theme of the battles of the Centaurs and Lapithæ, and which are now in the British Museum (known as the Phigalian Marbles), may be the production of some of the great master's pupils, as they must be of his age.

On the death of Cimon, 448 B.C., Pericles became for the next twenty years, until his own death in 429 B.C., the undisputed ruler of Athens; and thus left without a rival in power, with enormous resources at his command, and with his country's soil no longer polluted by the tread of the detested invader, he turned his attention to the restoration of ruined temples, or the construction of new wonders of architecture in different parts of Greece. It was, however, on the Acropolis that he bestowed his chief care;—on that sacred rock, the early citadel of Cecrops, the favoured abode of the heaven-born Pallas, the one holy spot in which the affections of the Athenians centred.

It seems to be quite recognised that an earlier temple than the Parthenon stood on the Acropolis,—that which was called the Hecatompedon, from its extending 100 feet in front. This temple was burnt by Xerxes, and partial remains have been found. Of its architecture we have no means of accurately judging. It is of its successor that we have now to speak—the new Hecatompedon—or, as it is more commonly called, the Parthenon.

Built entirely of the purest white marble, towering in its lofty aërie above all the city, the temple of Minerva rose conspicuous among a throng of noble structures. Raised on a platform of three steps, forty-six columns, each at least 6 feet in diameter, surrounded the cell of the building. Of these, eight formed the front of each portico, making a breadth of 101 feet by a length of 227 feet, in continuous and unbroken lines,—the great projection of the columns from the walls of the temple, and their contiguity to each other, producing a wonderful display of light and shade. In addition to the architectural effect of a building like this, 65 feet in height, we have to name the matchless sculptures which adorned the pediments and the friezes. In one of the former the Athenians saw represented the famous contest of their goddess with Neptune, for the privilege of naming their city; on the other, the chief deities of their mythology were assembled around the cloud-compelling Jupiter, to witness the introduction of his daughter to the gods.

But the great decorations of the temple, as illustrating its purpose, consisted of the famous friezes which extended for more than 500 feet, and contained upwards of 600 figures; these represented the Panathenaic procession, which twice a year passed round the walls of the building, and was therefore so appropriately sculptured upon it. But these sculptures, together with the celebrated metopes which adorned the outside, are so well known to us under the name of the Elgin marbles, that we need not describe them, and the models of the Parthenon, as in ruins and restored, also in the British Museum, render an account of the temple here unnecessary. To give some idea of the value of the Elgin marbles, it may be stated that Nollekens considered the Theseus as fine a work of art as the Apollo Belvidere, whilst by Westmacott and Rossi it was thought superior.

Within the area of this perfect shrine was placed the statue of the goddess herself, that statue which was the master-piece of Phidias, and called chryselephantine, because composed of ivory and gold, for nothing less costly than the most precious materials would in this instance satisfy the Athenians; the value of gold employed was equal to 130,000*l.* of our money. This statue, which existed till the days of Julian the Apostate, a period of 800 years, and which was 37 feet in height, was guarded from the sun and weather by a magnificent awning or veil, the costly Peplus, which was the work of the choicest Athenian maidens. This statue is lost, as well as five others of the same goddess, made by the same artist. One of these, in bronze, called the Minerva Promachus, and the wonder of the age, was 50 feet high, and placed outside the temple upon the rock of the Acropolis, it would be seen at a distance of 25 miles by the homeward-bound mariner, as he rounded the promontory of Sunium. But if we have to deplore the loss of these and other noble works of Phidias, we may rejoice that much is spared to the world of what may be taken for granted to be from his design, and we would fain believe, in some degree, from his execution also.* The Elgin marbles comprise the principal part of the sculptures which once adorned the walls of the Parthenon, and in looking upon these unrivalled performances we can hardly wonder that a goddess to whom the homage of so much intellect was paid, in whose behalf the intelligence of the most gifted was engaged, should receive at the hands of a people so prone to superstition as the Athenians, the honour due only to a being of a really divine nature. Such was the excess of their blind and erring zeal, that in their fear lest they should omit to pay divine honours to any of the countless thousands of their fancied and dazzling mythology, they even dedicated altars to unknown deities, and hence we perceive the peculiar force of that stern rebuke of the great Apostle St. Paul when he sojourned at Athens, "and his spirit was stirred within him," to use the expressive words of the sacred writer, "when he saw the city wholly given to idolatry." Standing in the midst of the Areopagus,† that mount so sacred and so solemn in the eyes of the Athenians, surrounded by the philosopher and the statesman, the stoic and the sage, as well by the trifler and the scoffer, with the idolatrous temples in full view, the undaunted Apostle thus addressed his hearers—"Ye men of Athens, I perceive that in all things ye are too superstitious. For as I passed by and beheld your devotions, I found an altar with this inscription, 'To the unknown God.'"—Acts xvii., 16, 22, 23.‡

G. R. FRENCH.

MANUFACTURE OF STEEL.—A New York paper announces that Mr. David Isham, a machinist, of Hartford, Connecticut, has invented a process by which a ton of iron can be converted into steel, of the best quality, in twenty minutes, in place of six to ten days.

* The thirteenth metope in the British Museum is considered to be from the hand of Phidias himself.

† Areo-pagus, *i.e.*, the Hill of Ares, or Mars—

"And here their hallow'd altars rose to Mars,
Hence its illustrious name the cliff retains,
The Mount of Mars."

Eumenides, by Æschylus.

‡ The remainder in our next.

AWARDS OF OFFICIAL REFEREES.

CHASES IN PARTY WALLS—CHIMNIES.

WITH regard to a chase for a fire-place now in progress of building, cut out of the party wall situate in Berkeley-square, in the district of St. George, Hanover-square, Westminster, 3½ feet deep, 2 feet 8 inches wide, and 3 feet 11 inches high, the district surveyor laid an information against the same, as an irregularity, the said chase being wider than 9 inches in the said wall.

The official referees awarded,—"That the cutting which has been made in the said party wall, is not such a cutting as is by the said Act allowed to be made in any party wall, whatever the thickness thereof may be, and is contrary to the Metropolitan Buildings Act; but we are of opinion that, with the consent of the adjoining owner, or the proper authority in default of such consent, it will not be contrary to the said Act to make the proposed chimney in, or add such chimney to, the said existing party wall, so that the same be done as directed by the rules of Schedule F of the said Act, 'with regard to chimnies and chimney-stacks, except angle chimnies, in reference to the construction thereof,' and by the modification of such rules dated the 7th day of April, 1846; that is to say, that such jambs and breast do not project more than 9 inches before the face of the wall to which the same shall adjoin, and that the whole of the new brickwork inserted must be in cement, and be in every course properly bonded and connected with the old brickwork; and if in making such a chimney so corbelled out, the inside of any chimney or flue is in any part to be at a distance less than 8½ inches from the other side of the same wall, then the brickwork of such wall must be removed throughout the whole thickness of such wall in such part thereof, and new brickwork inserted as aforesaid. Nevertheless, no chimney may be formed in any party wall, unless the back of the opening thereof be 8½ inches thick from the hearth, to the height of 12 inches above the mantel, nor may any flue be formed of less diameter than 8½ inches."

PLACES OF PUBLIC RESORT.—STAIRCASES.

With regard to a building known as the Britannia Saloon, situate in the district of St. Leonard's, Shoreditch, a requisition was received, setting forth that the occupier, Mr. Lane, was about to remove a small and inconvenient wooden staircase leading to the upper part of the said building, and to erect in lieu thereof a wider and more convenient staircase, and that the district surveyor had objected to the said proposed new staircase as being contrary to the Metropolitan Buildings Act, in so far as it was not to be wholly made of and supported by fire-proof materials. At the hearing, it appeared that it was intended by means of the said staircase to give access to a new addition to a public gallery, and that room would be contained in the said new addition for from 200 to 250 persons, and that the whole of the said gallery when enlarged, would contain about 1,000 persons: but the said Samuel Lane contended that the rule contained in Schedule C, part 6, of the Metropolitan Buildings Act, did not apply, inasmuch as the work proposed was only to substitute a new wooden staircase for a wooden one already existing. The official referees awarded that "inasmuch as the addition proposed to be made to the said gallery is intended for the assemblage of persons in large numbers and for public congregation, either such addition or the said gallery when enlarged thereby, must have accesses and stairs or other ways of ingress or egress within the said building, wholly supported, constructed, formed, made, and finished fire-proof, and that if the existing stairs be retained or be reinstated of wood, it will be necessary to make new accesses and stairs in conformity with the said Act for the service of the said intended addition."

FIRE THROUGH PLUMBERS.—The destruction by fire of Sandon Hall, Staffordshire, the seat of the Earl of Harrowby, is ascribed to plumbers who were at work on the roof. The plumbers, as a body, have a heavy charge to answer for in respect of similar occurrences, which should make them, as individuals, much more careful than they usually are.

THEORY OF THE ARCH APPLIED.*

IT is hoped that the description and examples given last week, are in sufficient detail to render the use of the table apparent; in the following examples results only will be given. In the three first, arches of the dimensions of those of three of the boldest bridges which have ever been constructed are compared with regard to the stress upon their materials. The depths of the permanent loads and allowance loads over the crowns are taken respectively, at 2 feet 6 inches, and 3 feet, in all of them. The arches are supposed to be so proportioned as not to be stronger at the crowns than at any other parts.

The dimensions of the centre arch of the bridge of La Santa Trinita, at Florence, built by Ammanati are, span, 96 feet; rise, 16 feet; height of keystone, 3·17 feet. Its form, though slightly pointed, as it consists of two intersecting parabolic arcs, does not vary greatly (according to Mr. Cresy, from whose Encyclopædia the above and following dimensions have been copied), from a semi-ellipse. Supposing it then to be elliptical (to avoid broaching the proper formula, however simple it may be). By formula (4), if T. = 3·17 + 2·5 + 3 = 8·67, S = 886·25 $C = \frac{886{\cdot}25}{3{\cdot}17} = 279{\cdot}5$. The material is white marble, the modulus of fracture, 5,058 feet, and $\frac{5058}{279{\cdot}5} = 18$, so that the actual pressure upon the materials of such an arch so loaded would be only an eighteenth part of what would crush it, and there would be an excess of resistance to crushing equal to seventeen times it own pressure.

The bridge built at Maidenhead by Mr. Brunel, is semi-elliptical; its arches have a span of 128 feet, rise of 24·25, and depth of arch at the crown of 5·25 feet. If T = 5·25 + 5·5 = 10·75, by formula (4) C = 246·7. The arches are of brick, the modulus of fracture of which material has been estimated at 858 feet, $\frac{858}{246{\cdot}7} = 3{\cdot}45$, and 2·45 is the ratio of the excess of strength.

Chester-bridge, built by Mr. Harrison, has a segmental arch of about 90 degrees, the radius being 141·4 feet, and the span 200 feet: the key-stone is 4 feet deep. If T = 4 + 5·5 = 9·5, and F = 28 feet (fig. 3), by formula (3) C = 385·7 feet. If 5,058 feet be taken for the modulus of fracture, as was done with regard to Ammanatis' bridge, $\frac{5058}{385{\cdot}7} = 13{\cdot}1$, and the excess of its resistance is as 12 to 17 as compared with La Santa Tritrita-bridge, and as 12 to 2½ as compared with Maidenhead-bridge. If 9,581 feet, the reputed modulus of granite be taken, $\frac{9581}{385{\cdot}7} = 24{\cdot}8$, and the comparative numbers are as 24 to 17, and 24 to 2·5. Notwithstanding the boldness of the Maidenhead-bridge, its strength would appear to be excessive if it were to be compared with some structures which depend for strength upon the tenacity of cast-iron.

An arch between the towers of Lincoln Cathedral has been considered a prodigy: its span is 28 feet, versed-sine 9 inches, depth at the crown 11 inches, and breadth 1 foot 9 inches; the linear measure of the horizontal stress is only about 100 feet. This, and such-like arches, from their want of mass and liability to great vibration, are quite unfitted to resist the action of any considerable impact.

It will be useful to consider the case of an arch with equal loads upon the haunches, and with the curve of equilibrium symmetrical. Edwards, a Welch mason, who obtained great reputation as a bridge builder through dearly-bought experience, having built a bridge of three arches over the Taafe, in South Wales, which was destroyed by a flood, was bound by his contract to reinstate it. In order to avoid a similar accident, he determined to span the river with a single arch out of reach of the waters. The arch which was chosen by him was a segment of a circle of about 106 degrees, the chord being 140 feet, the versed-sine 35 feet, and the radius about 87·6 feet. The thickness of the arch was 2 feet 6 inches. When the bridge was complete, with the exception of the parapets, it failed, and the unfortunate mason had to commence his work a third time. He perceived that he had overloaded the haunches, which being flattened and descending, gave a greater curvature to the crown, and caused it to ascend. To remedy this defect, not varying the form of the intrados, he constructed the spandrils of his third bridge with hollow spaces in the shape of barrels, and was at length successful. Had this intelligent practical man possessed the knowledge of a Rennie or a Southern, and examined his second design by the principles of equilibrium, he no doubt would have discovered in what respect it was faulty.

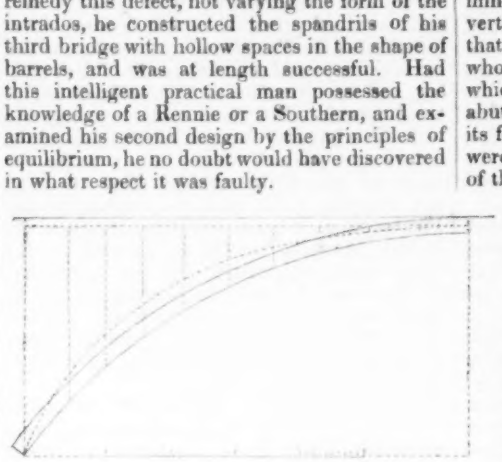


Fig. 6.

Let an arch of the above dimensions (fig. 6) be supposed backed up to the level of the top of the key-stone. By the first formula, the horizontal stress is as 509·42 feet, its linear measure is 203·7 feet; a pressure such as this, though not sufficient to crush, would, in all probability, compress the materials; it is important, therefore, that it should be distributed equally (for if one side of an arch be compressed the opposite side will be relieved from pressure, and the joints perhaps open), and this would be the case if the curve of equilibrium were included within the thickness of the arch, though the less it approaches the extrados the better. It should be mentioned that no account is ever taken of the slight degree of cohesion which exists by means of the cement between the beds of the voussoirs; Edwards might, perhaps, have prevented his arch from springing, for a time, had he tied the key to the springing stones with strong iron bars or by cramping the joints where likely to open—if he, a good practical mason, could ever have thought of so miserable a substitute for good construction.

The ordinates of the equilibrial curve, from 5 to 45 degrees, calculated by formula (7), are ·22, ·62, 1·51, 2·97, 5·14, 8·32, 12·36, 17·61, and 23·96 feet, and are so laid down in the figure, which shews that the thickness of 2 feet 6 inches given to the voussoirs would not be sufficient to include the curve if the extradossing had been carried up regularly to the level supposed. The variation is so great, that it is difficult to conceive how such a bridge could have been constructed nearly to completion (notwithstanding the support of a tolerable centre), without recourse being made to the expedient of loading over the crown as the lower part of the extradossing was proceeded with to preserve, in some degree, the equilibrium, and it may be supposed that when this resource failed, with it the bridge failed. Had Edwards increased the thickness of the voussoirs towards the abutments, in the manner now generally practised, there is no doubt that his second bridge would have stood, notwithstanding the injudicious loading over the haunches and the excessive lightness at the crown. In this case there are five points of fracture, one at each abutment, where the curve of equilibrium intersects the intrados, one over each haunch at the point of the extrados, most distant from the curve of equilibrium, and one at the underside of the vertex of the arch. It is at these points that fracture would be *likely* to occur; they may be defined as points of partial or greatest pressure; for it does not necessarily follow, that such an arch so loaded would be broken or even change form; this depends upon the resistance of the materials near those parts, but they would be more strained than those on the opposite side of the thickness of the arch. The curve of equilibrium has been sometimes denominated the line of resistance; it is evident from the way in which it is determined (from the pressure), that it is not related, but rather opposed to the resistance of the materials; it is sometimes, and with propriety, called the line of pressure.

Before taking leave of the subject, a few words with regard to abutment walls, upon whose stability the stability of arches must depend, will not be out of place. Two of the methods which have been employed to determine the thickness of their bases will be adverted to. It is assumed in the following method that an abutment is a perfectly solid mass, whose outer edge (*s*), fig. 1, is a fulcrum, about which the horizontal thrust would cause the abutment to be turned, and to be lifted from its foundation, if the momentum of the thrust were to exceed the momentum of the gravity of the abutment (V), and the vertical momentum of the arch, and load upon it (W). The least thickness, therefore, which can be given to the base, upon this supposition, is where the $(st) \times w + (ru) \times V = S \times (ot)$. If the wall be rectangular, as represented in the figure, $t\,q = 40$ feet, and S = 201·375, the thickness (*st*) determined by the above equation is about 8 feet 3 inches; with this thickness only the wall would be in the same condition of equilibrium as a mass (*qrsv*), so overhanging its base that a perpendicular line from its centre of gravity would coincide with one of its edges (*s*). The builder, if he choose this mode of calculation, must be mindful of this circumstance, and will do well to double (at least) in practice, the theoretical base.

It is now usual with large arches to incline the joints of the abutment stones like the joints of an arch, and the second method adverted to rather squares with this excellent practice, as it consists in continuing the curve of equilibrium through the abutments to the foundation, account only being taken of a portion of the materials intended to be eventually employed, and as though that portion were a continuation of the arch. If a builder choose this method, he may find any number of ordinates upon the principles before explained.

This method is illustrated in Fig. 4, the only part taken into account in calculating the ordinates (*mn*), (*op*), (*qr*), is that in the form of a flying buttress between (*i*) and (*q*) 6 feet deep; they were taken at 10 feet apart, and were found to be respectively 16·4, 25, and 34·9 feet.

The curve of equilibrium being traced to the foundation, the question arises as to the ability of the foundation to resist the pressures to which it may be subject, a matter rather for the exercise of a builder's practical knowledge, in each particular case, than of calculation.

The principles applied above to the arch are of universal application, and have long been familiar to the well-instructed architect and engineer. The artisan who has to construct with the work of his hands the designs of others, should also be acquainted with them to enable him to do his office with security to himself; and they ought to be a standing subject for illustration at all mechanical institutions intended for his benefit. The principle of equilibrium in relation to the resistance of materials is due to the great Galileo, who, in his work* upon the subject published in 1638, designates his invention as a new science. The doctrine of equilibrium, relating to weight only, is as old as the time of Aristotle; with this, the architects of the middle ages, if we may judge from their works, in which a much nearer approach is to be observed to an exact equipoise of the masses than in any ancient or modern structures, appear to have been thoroughly acquainted. As to the resistance of the materials introduced into the estimate by Galileo, they would not be much behind us in knowledge; for it must be confessed that our knowledge at present of the resisting qualities of stones, &c., derived from experiments, is very imperfect, and that the numbers, measures, or moduli, as they are called, derived from them, must be considered rather as relative than positive.

J. P. W.

* See p. 295, *ante*.

* The principles explained in the portion of this remarkable work, entitled, "De Motu Locali," have produced most ample results under the treatment of his successor, Newton, and Newton's followers. That Galileo was perfectly aware of the importance of his inventions is evident from the following prophetical passage, as well as from a parallel passage in the printer's preface:—"Observatum est, missilia, seu projecta, lineam qualitercunque curvam designare; verumtamen eam esse parabolam nemo prodidit. Hæc ita esse, et alia non pauca, nec minus scitu digna, a me demonstrabuntur: et quod pluris faciendum facio, aditus et accessus ad amplissimam, præstantissimamque scientiam, cujus hi nostri labores erunt elementa, recludet; in qua ingenia meo perspicaciora abditiores recessus penetrabunt."

STOPPAGE OF WORKS.—A WORD FOR THE WORKMAN.

The remarks which have appeared in our journal on the unwise and unjust stoppage of works by Government, adding hundreds to the number of suffering operatives, have been loudly responded to in many quarters. Our brethren of the press gave increased circulation to them, thus shewing an appreciation of the truth of what was said; and Government, if they are wise, will not disregard the statements. "Men cannot starve, and see wives and children struggling with all the privations of destitution, and not feel that their existence ought to be one of the cares of the Government." Instead of suspending works at such a moment,—works, too, of utility, of necessity,—they should rather increase them. If economy must be practised (and let us tell them that IT MUST BE; the nation have said it, and the nation will see it carried out), let it be at the expense of those who are receiving their thousands a year for doing nothing,—not to the ruin, body and soul, of the poor artisan, to whom want of employment is destruction. The powerful satirist *Punch*, last week, taking up our words, shewed in clear colours, by a dozen lines, the selfishness of the proceeding. It would be easy to shew that it is both wicked and shortsighted. Earnestly we exhort the Woods and Forests to reconsider the subject.

A correspondent writes us on the subject as follows, with the view of leading the master-builders to provide a protection for the workmen against such occurrences:—

Noticing in a recent number of your journal some remarks on the sudden dismissal of workmen, I am induced to trouble you with this letter, in the hope of seriously calling the attention of the master-builders to this subject.

Among the grievances of which workmen have to complain, none are so prominent as that resulting from the sudden and capricious suspension of works. Large bodies of men are called together—probably many miles from their homes—and are frequently dismissed at a moment's notice, no previous intimation having been made, nor the least consideration shewn for their sufferings and disappointment. Builders' workmen suffer sufficiently from frosty and rainy seasons, and are seldom employed, on the average, more than nine months out of the twelve, without being exposed to loss from the sudden break-up of works, when they have travelled many miles from home to serve their employer. This common indifference to the interests and feelings of the working-man, coupled with other circumstances, renders him disaffected towards his master and the state—regarding his employer as a person only thinking of the increase of his wealth by the talent and sweat of the brow of the poor.

The idle Monday that usually follows the sudden dismissal of the Saturday night is often the ruin of the workman. The bitterness of disappointment engendered by sudden dismissal, after days of zealous and anxious toil, makes the heart sick. Take the case of a working man, of industrious and sober habits, with a wife and three or four children, one who has been out of employment a long winter, and who has spent all his savings, and parted with many of his goods and chattels to support his family. He leaves London for a country job, and after a few weeks' work, the job being large, and likely to last the summer, he arranges for his wife and children to join him. He has no sooner done this than the next Saturday is fatal to his hopes; the works are stopped, and he is sent "about his business." No notice, not even a day's warning, given to him, so that he might have the opportunity during after hours of communicating with his old mates, in town or elsewhere, on the subject of fresh employment. Now, this is a common case, and the workman so treated feels that he is made use of as a garment, and when done with cast aside and forgotten.

I know it will be urged that it is impracticable to avoid, at all times, the circumstances of which I complain;—this I deny. It is perfectly as easy for contractors to make such terms with their employers in this respect, as it is to make terms to protect themselves from loss upon plant and materials by such stoppages.

It would be well for contractors to consider these matters, and to estimate properly the value of the respectful bearing of the working-man, particularly now, as a bad spirit is abroad and doing its work with many; and during the late apprehended Chartist disturbances many terrible expressions fell from working men, which shewed how keenly their wrongs rankled within them. Carpenters, bricklayers, plasterers, painters, decorators, &c., all are now the servants of the one master, the builder; and workmen in these branches feel how small their chances are of raising their condition without the aid of capital. The old guilds for the regulation of trades exist but in name, and no longer protect the working-man from the grasp of the monopolist.

It is impossible in a letter, or many letters, to speak of the thousand ills workmen are subject to from want of a little forethought on the part of their employers. The majority of builders are persons in reality in advance of the other orders of society, but they are so hurried in their daily avocations by the spirit of competition, that the only impulse manifest in their conduct is that of completing their work with satisfaction to the architect, and meeting their money engagements. There is a want of unity among them, and it is that which prevents any great good being effected for those upon whose labour they depend.

There are no working men so well informed, so orderly, or so well conducted as the building workmen. The science they are attached to begets order, even in those who are its humblest handmaids, and by only a little, a very little effort on the part of the great builders, the condition of the building workmen might be improved beyond that of almost any other class, and the arts thereby advanced.

THE ATMOSPHERIC RAILWAY SYSTEMS.

NEGATIVE AND POSITIVE, OR EXHAUSTIVE AND COMPRESSIVE.

The misgivings with which we have from the outset noted the boasted progress of the atmospheric system on the only modifications of the principle yet attempted in practice, have been recently more than justified on the South Devon line, where, as Sir W. S. Harris, of Plymouth, in his evidence on the Exeter and Crediton, evidences, it "is eternally stopping, and, in his opinion, is utterly incapable of practical or commercial utility." The valve, of course, and the sealing composition, are the sores which require perpetual healing and doctoring: and it is not by catching cold in the midst of frost and snow alone that the windpipe thus gets out of order; for no sooner have the stillness of frost and the slush of snow in winter given place to the drying breeze of spring and the melting heat of summer, than the wind and the dust do the work of the frost and snow, in as pertinaciously attacking its tender organism, by drying and clogging its sealing material in place of freezing it, thus as effectually deranging the working of the line, if not, too, the patience and the wits of its officials. In order to obviate the evils resulting from the influence of wind and dust on the sealing composition, and otherwise to improve the longitudinal valve, a correspondent, Mr. G. C. Warren, proposes that the slit or valve be made of vulcanised Indian rubber, fixed into a deep groove on one side, so as to be compressible into that groove by the piston-rod, and to issue out of it again by its own elasticity, while the free edge slips out of and into a shallower groove on the opposite side as the rod runs along, thus affording the requisite protection to the sealing material.* The opening edge of the valve he proposes to tip with leather, rendered supple with sealing material, and the bottom of the shallow groove in which it works, he adds, might be lined with a slip of vulcanized rubber, or also with suppled leather. The rubber, as he remarks, will not be affected by changes of temperature; but will not its elasticity afford too great a probability of its being sucked into the vacuum altogether, sealing compositions notwithstanding? Otherwise, however, our correspondent's suggestion is well worthy of consideration, if this sort, or any sort of valve is to be persisted in. An elastic steel valve, as our readers may recollect, was lately patented. The experimental line, on this plan, according to the patentees, has worked for some time both steadily and cheaply; and a new line is about to be laid down which they declare will work for a century without being in the least impaired. The inefficiency of Messrs. Clegg and Samuda's principle has given rise to other and still more recent incipient improvements, among which is that patented by Messrs. Harlow and Young, of Bermondsey, in which the action of the valve is precisely similar to that of the slide valve of a steam engine, and all material of a more destructible nature is replaced by metal. Here, too, the coulter is not much thicker than the blade of a saw, the want of strength in thickness, we presume, being so far made up by breadth, and the slit being accordingly very narrow. The whole is thus also protected from grit, wet, snow, &c., by the top plates, between which the coulter connecting the piston with the leading carriage runs.

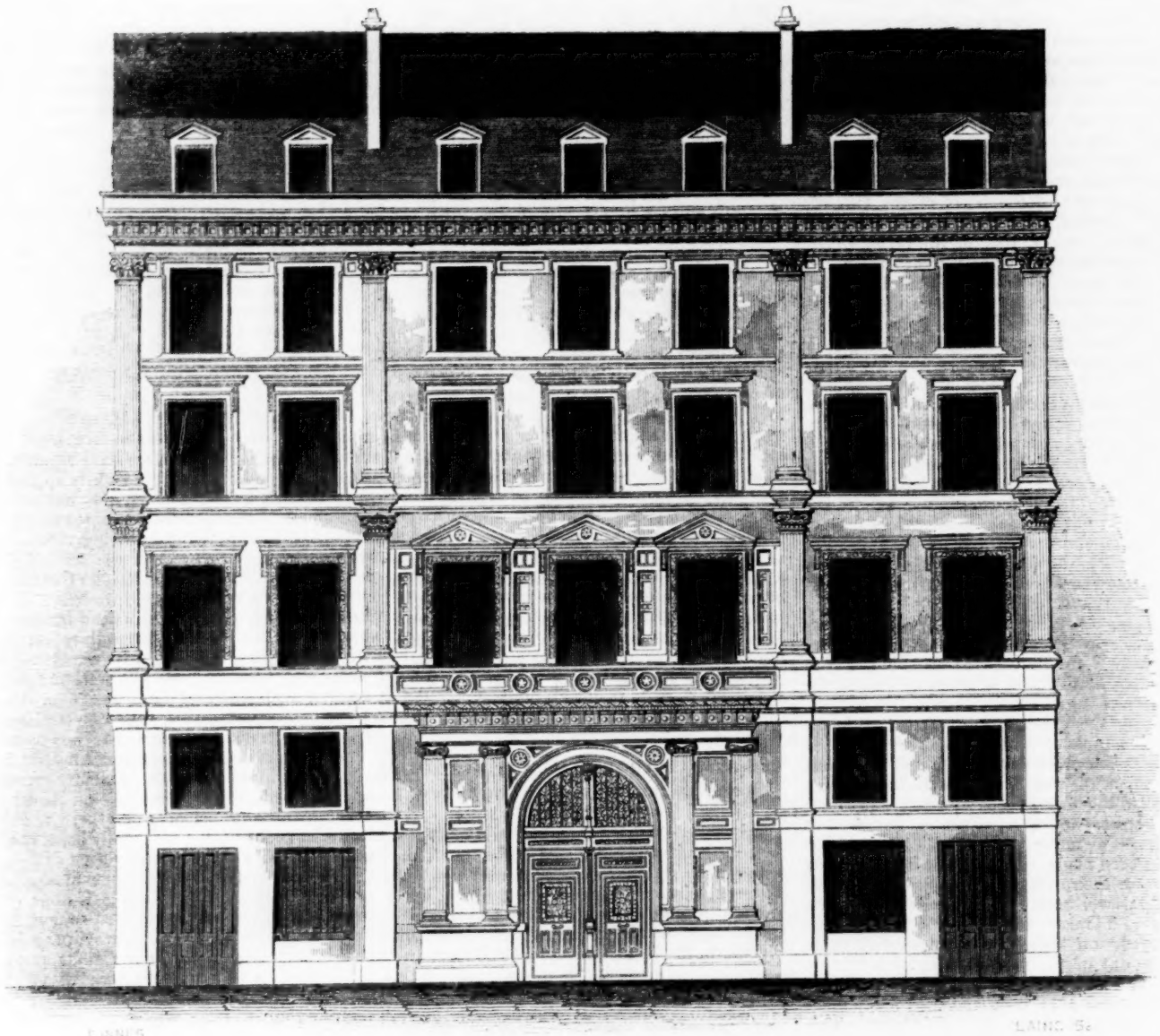
The atmospheric principle, as the correspondent, whose suggestion we have just noted, reminds us, is one we have regarded as a safe, or good one, were it rightly applied to railway lines, but we hope he does not thereby consider us committed entirely to the longitudinal valve. Indeed, the two most ingenious, if not most feasible schemes we recollect of, had no such valves. In the one, a needle threaded its way through a series of short recurring valves, through which the communication between the interior of the tube and the exterior, and hence the impetus, was kept up. In the other, the power was 'laid on' like gas or water through a main, with bilateral branches, to a double series of simple engines, with *wheels along the line*, through which the impetus was communicated to *rails along the train*, being, in fact, a complete inversion of the ordinary principle and mode of railway locomotion. And however complex or fanciful, or otherwise objectionable, such schemes may really be, or not be, they probably comprehend the germs of some future and better hope for the atmospheric ordinary or exhaustive principle, if none other prove successful. The renewed or sustained interest in this mode of railway propulsion, at this moment manifested in various quarters, is no doubt spurred into sustained vivacity, by the endless succession of fatal accidents on other lines, from which the atmospheric principle is naturally looked to as a redemption of at least as hopeful a character as anything to be expected from the present system of railway direction.

We have hitherto talked exclusively of the power of the atmospheric vacuum, or what may be called the negative or exhaustive system; but the model of a line to be worked compressively, as we may term it, upon the atmospheric system, has been laid down near the Rosemary Branch at Peckham. The valve in this case is a longitudinal one, formed of vulcanized caoutchouc, with grooves, apparently arranged on the plan proposed by Mr. Warren for adaptation to the Devon, though *it* works by exhaustion. The tube is only half the size and weight of that of the latter. Four hundred and fifty feet of it have been laid down by the patentees; but the air, which is compressed by a Cambrian engine, with air pumps, into a reservoir at one end of it, only acts on 200 feet of the tube, the piston being then arrested in its course, and the carriage running on by the momentum obtained. A writer in the *Mining Journal* speaks rather favourably of its performance. The air, in each experiment he witnessed, was compressed to about 30 lbs. on the inch super.; and the propelling power, in a tube 2½ inches in diameter, was thus 147 lbs., on a carriage of 5 cwt., loaded with pig iron to rather more than a ton, and propelled up an incline of 1 in 30 at the termination of the tubes.

Between longitudinal valves, then, and no valves at all, and between air acting by compression, and the same agent acting by exhaustion, surely something will come out of it, although, in the meantime, we can see no one quite unobjectionable realization of an idea even already pretty well turned over, if not tortured, in the various ingenious endeavours already made to turn it to account.

* If otherwise practicable, and friction sufficiently reducible, might not any leakage from the opening before and behind the piston-rod on this plan, be prevented by a properly shaped washer of vulcanized rubber on the piston-rod?

STREET ARCHITECTURE—PARIS.



HOTEL LACARRIERE.—M. ROLLAND, ARCHITECT.

STREET ARCHITECTURE.—PARIS.

FRONT OF THE HOTEL LACARRIERE.

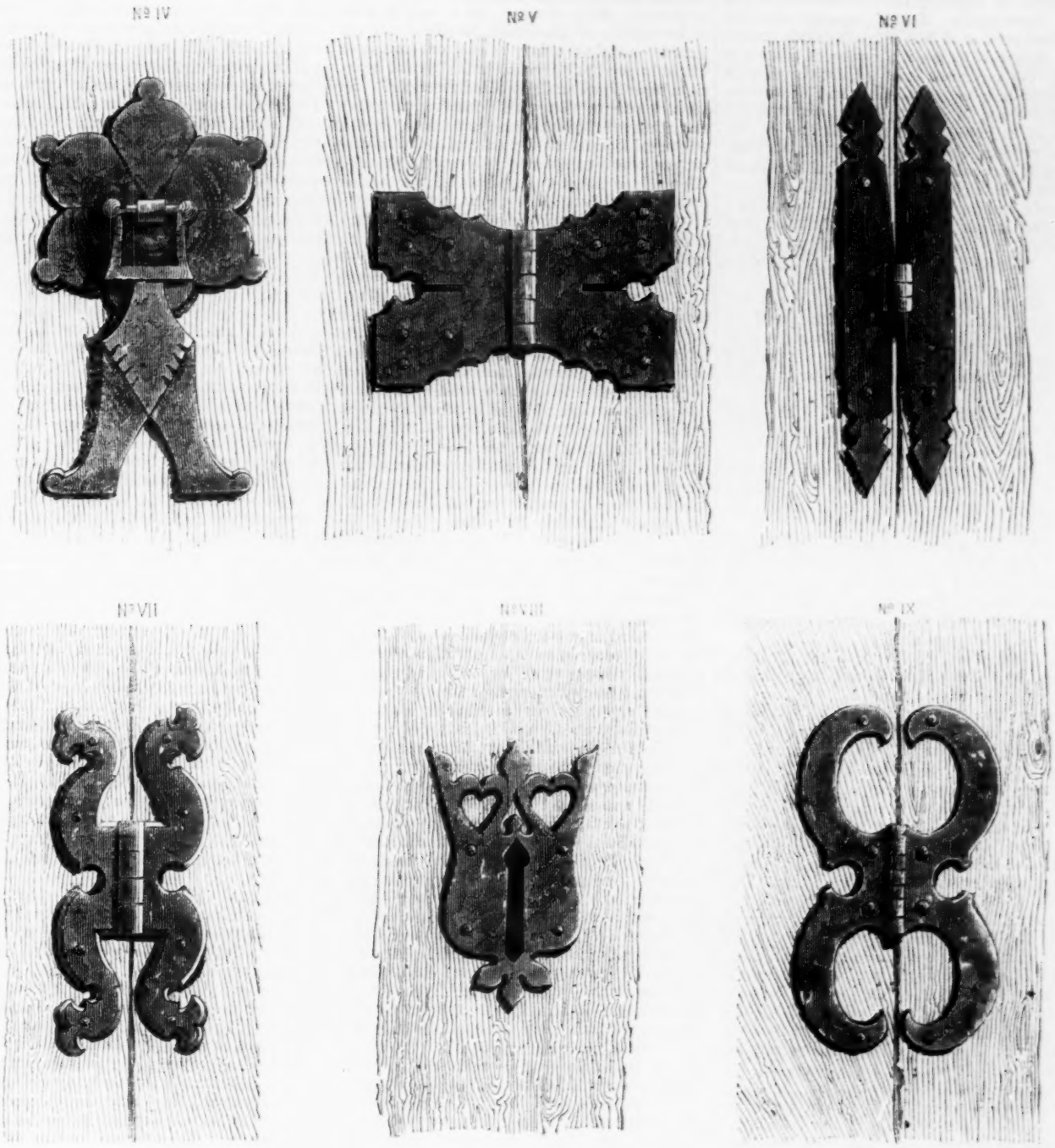
ANNEXED, we give the entrance-front of the *Hotel Lacarrière*, in the *Rue de Vendôme*, Paris, erected from the designs of M. Rolland, architect. It has a frontage of 74 feet, and is 62 feet high to the top of the entablature. A description of the building was promised in the *Moniteur des Architectes*, wherein the elevation, plan, and some of the details first appeared, but the troubles of the revolution have led to the temporary suspension of that work,—a circumstance much to be regretted. The last number of the *Moniteur* which was published contained a translation of our descriptive account of the Palm House at Kew.

NOTES IN THE PROVINCES.

VARIOUS improvements have been lately carried out at Isleworth. The new burial ground adjoining the old was to be consecrated on 21st inst. The whole has been enclosed with an iron railing. The old altar window of the church has been replaced by a new one, of stained glass, by Collins, from a design by Miss Honywood, of Isleworth-house. The pews are to be remodelled.——Some ornamental figures surmounting the pillars at the gate entrance to Wilton-house have been wantonly or maliciously destroyed. They had been recently executed by a local artist, Mr. Rex.——The building of the new lock-up at Stratford-on-Avon has been begun by the contractors, Messrs. William Martin and Son, of that town. It is to be of brick, with freestone dressings, and to cost about 800*l.*——It has been resolved at a public meeting in Birmingham to establish a model lodging-house for the poor there.——The Liverpool Health Committee have been requested by the town council, to report as to the best means of laying out a great extent of vacant land in the municipal borough, with reference to existing and future streets, and on some regular plan. Mr. Earle, in proposing the resolution, stated that "a very important improvement, extending over upwards of four miles of road, could be effected at the north end of the town for 66,000*l.* The sum might appear large, but let the council recollect that they had expended 20,000*l.* in widening Parker-street."——From an abstract of receipts and disbursements under the Sanitary Act for Liverpool, it appears that the expenses of the sewerage and drainage in the Parliamentary borough from January 1 to March 31, 1847, were 34,516*l.* odds, the receipts amounting to within 6,068*l.* of that sum. From 1st April, 1847, to 31st March, 1848, the amount expended was 151,770*l.* odds, and the sum received less by 12,961*l.* 3s.——The first stone of a new National School for 500 children, at New Wortley, was laid on Whit-Monday.——A scheme on an extensive scale for providing dwellings for the working classes in Edinburgh is in contemplation. It is said that about 20,000*l.* will be invested in the undertaking.——A report by the Plans and Works Committee of that City, on the annual report of the Superintendent of Public Works on the state of the City churches, and suggesting extensive repairs on the Tron Church, and that those contemplated on the High Church should be delayed till next year, has been cannily "approved by the Council, so far as the High Church was concerned."——A considerable number of the operative masons of Glasgow have struck, on their employers attempting to reduce their wages about 10 per cent.

VENTILATION OF SHIPS.—Sir: It has been proposed, in your excellent journal, as a means of ventilating emigrant ships, that the cooking should take place *under deck*. I can see no objection to that arrangement, if people choose to adopt it. It would tend to promote warmth and cheerfulness, and prove a great convenience to female passengers, more especially in cold and stormy weather. I would propose, however, in any case, that a flat or round sheet-iron tube reaching nearly to the lower deck, should be attached to the back of the cooking-stove, and extend high enough above the upper deck, or gangway, so as to give sufficient vent to the heated air, and not be in the way of return smoke. Tubes for admitting fresh air should be attached to the different masts. The cooking-stoves would act as *fourneaux d'appel*, and the vessel would be ventilated in all weathers.—H. MCCORMAC, M.D.

EXAMPLES OF ANCIENT IRONWORK.



EXAMPLES OF OLD IRON-WORK.

Last week our number contained three engravings of ancient escutcheons: we now lay before our readers six examples of hinges, &c., equally good and simple.

No. 4. Handle, from a cabinet.

No. 5. Hinge, Stanton Church, Suffolk.

No. 6. Hinge, St. Michael's Church, St. Alban's.

No. 7. Hinge at a church at Rochester.

No. 8. Escutcheon at Westminster Abbey.

No. 9. Hinge at Perrivale Church, Middlesex.

Fall of a Suspension Bridge.—The Micklewood suspension bridge, "erected," according to the *Scottish Railway Gazette*, "on the thrust and tension principle, the same as that which sustains the Conway tube," fell into the Forth on Monday week. The span of the bridge was 101 feet, and it was made of timber: to the spread of dry-rot the fall is attributed. "Slight symptoms of the decay were observed" on the Saturday previous to the fall, but it was not until too late that the further extension of the rot was ascertained.

VENTILATION OF SCHOOL-HOUSES IN AMERICA.

We have before us reports and other documents which shew that in the city of Boston the authorities, having satisfied themselves of the necessity of having fresh air, have been expending a large sum of money in ventilating all the city school-houses. The reports are very interesting, as shewing how thoroughly the necessity for this step has come home to our transatlantic brethren. There is much to do in this respect in England. Many of our national and other free schools are nurseries of disease.

The committee appointed to examine the Boston school-houses propose "the following as an outline of the best general plan for warming and ventilating the school-houses.

1. The air must be taken from a pure source and from the higher parts of the building, if any impurities are found to exist near the surface of the ground.

2. In order to ensure a constant and abundant supply, the air-shaft, when carried above the building, must be surmounted with a cowl or hood of some kind, with its mouth turned *towards the wind*.

3. The fresh air should in all cases be carried entirely beneath the furnace. If the cellar is wet and the situation low, the underground culvert, or channel, should be of brick, laid in cement.

4. The furnace-chamber should be so large that it can be entered at any time, without the necessity of taking down walls, for the purpose of repairs, or to observe the temperature. A large earthern pan for the evaporation of water should not be omitted. This should be kept perfectly clean, and the water required to be frequently changed.

5. A thermometer should be constantly at hand, and the temperature in the warm-air chamber should never be allowed to exceed that of boiling water. A still lower temperature is often desirable. If this point is secured, the hot air can be conducted with perfect safety into any part of the building.

6. The openings for the admission of the warm air into the rooms, should be as numerous as possible. The long platform occupied by the teachers might be made an excellent diffusing surface.

7. Openings of ample size must be made in the highest points of the ceiling, to be con-

nected at the top of the roof with a turn-cap or louvre, the former being always surmounted with a vane. It is better that the ceiling should be perforated at its centre, and there is no objection to running the ventilating shaft, at first, horizontally, if the perpendicular and terminal portion of it is of considerable length.

8. It is well to have a power of some sort within the apparatus at its top, for the purpose of compelling constant action, and of increasing the force of the apparatus, whenever the state of the weather, or the crowding of the room, renders it necessary. For this purpose, the most convenient and economical means are furnished by a gas burner, an argand lamp, or a stove; and one of these may be in constant readiness for use, when neither the velocity of the wind, nor the low temperature of the external atmosphere, is sufficient to produce the desired effect.

9. All the openings and flues for the admission of pure air, and the discharge of the foul air, should be of the maximum size; that is, they should be calculated for the largest numbers which the apartment is ever intended to accommodate.

10. Valves must be so placed in the flues as to be easily regulated without leaving the rooms into which they open.

11. The best average temperature for school-rooms is from 64 deg. to 68 deg. Fahrenheit; this range including that of the healthiest climates in their best seasons.

12. For the purpose of summer ventilation, and for occasional use in moderate weather, fireplaces of good size may be constructed in the new houses. They should always be double, and furnished with chambers communicating with the open air.

13. Each story of the building must be warmed by a furnace or stoves, appropriated exclusively for its own use."

They require each room to have a ventiduct discharging itself at the roof, and not connected with any other apartment. These ducts are placed at the part of the room most distant from the ventilating stove, or the opening from the hot-air furnace, and should be constructed if possible in or upon an interior wall or partition. "They should be made of thoroughly-seasoned sound pine-boards, smoothed on the inner side, and put together with 2-inch iron screws. The outside finish may be of lath and plaster." They must be carried entirely to the floor, and should be fitted at the top and bottom with a swivel blind or register, whose capacity is equal to that of the ventiduct into which it opens. This valve is governed by stay rods or pulleys.

A room containing sixty scholars is found to require a discharging duct of fourteen inches in diameter. A room for 100 scholars requires the tube to be 18 inches; and a room for 200 scholars requires it to be 24 inches.

The fresh air ventiducts should exceed in capacity those for carrying off the impure air by about 50 per cent.; so that there will then always be a surplus or plenum supply, and the little currents of cold air which press in at the crevices of the doors and windows will be entirely prevented.

RAILWAY ACCIDENTS AND THEIR PREVENTION.

TRIM OF TRAINS IN TRANSIT.

WE should like to see a full, true, and particular list *now* of the patent and other responses to Fortunatus's 'wish' that 'means of preventing accidents *were suggested* by some one or other, since the directory had failed to discover or invent any worth looking at.' We ourselves have added not a few to the heap in vain accumulated since we uselessly sacrificed upwards of one whole page of our journal at once in sincere response to the insincere 'wish.' The last new 'patent railway signal' is Tattersall's, to be used in such cases as the breaking of an axle, running off the rail, &c. It is chiefly intended to obviate objections to some previous projects of a like order. A box is fitted with a barrel spring, and a cord wound round it is run along the line of carriages, through open rings or hooks in the roof, from the guards to the driver, or rather to a steam whistle on the engine. There is virtually *nothing* new however in this: a correspondent in THE BUILDER long ago suggested nearly the same thing, and it has since repeatedly presented itself with some slight modification or other. Amongst the multitude of suggestions out of which directors might choose, we have seen none to excel, or even to equal our own in matter of fact practicability, and in varied utility, namely, that a freedom of personal movement along a train, on a regular beat, either outside or in, should be afforded to the guards, so that either driver or passenger might be promptly reached on accidental occasion, or at short and appointed intervals. In such a case as that which occurred the other day, when a turbulent, insane, or drunken person presented a pistol at the head of a fellow-passenger, the most prompt aid might thus be afforded; or in cases of sudden insanity which so often and so oddly occur in transit; or in an emergency such as that in which both driver and stoker lay dead drunk on the engine while it was rattling along at the rate of 50 miles an hour, with a coming train on the same line of rail; or, in short, in a multitude of unforeseen circumstances, in which cords and pulleys, or any other means of communication whatever between guards, passengers, and drivers, would either be useless, annoying, or imprudent,—by the simple means alluded to everything necessary could be promptly done, and any intimation to the driver to stop, &c., made by the same mode, *over and above*, as in the case of an axle breaking, or a carriage running off the line, in any part of a train, however short or long, by one or other of the guards or watchmen from either end of the train. This one suggestion, in short, appears to afford a remedy or prevention for a greater number of possible or actual casualties in transit than those offered or afforded by any one suggestion we recollect of, and it is therefore entitled to marked consideration as one of the most economical and useful, as well as practical, amongst the multitude of suggestions heretofore advanced. Perhaps the best possible argument in its favour, and evidence of its prospective utility, is in the fact that in various circumstances, the nearest possible approximation to its rough practice, suggested by necessity or impelled by peril, has been naturally and almost instinctively resorted to by the guards in the dangerous, uncertain, and most unofficial and reprehensible practice of crawling along the tops of the carriages, whereby, nevertheless, as in one case just alluded to, the lives of hundreds were saved from inevitable destruction, though at the double hazard incurred by the very want of a proper gangway or connected line of footboards. Even the other day, too, the practical working of this same rude and perilous substitute naturally displayed itself in circumstances of alarm, arising from the fall of a child out of a carriage in transit. The attention of one of the guards was attracted by an outcry of some of the passengers, and—helpless as his position was, and a mockery his office, to all but a 'guard' possessed of a reckless and ultra-official daring for which the railway management is most blameable, in thus morally compelling its necessity, by not practically obviating it, as they can so easily do—anxiety to ascertain the cause of the outcry, and it may be even fear of the personal as well as other consequences if he hesitated, irresistably prompted this guard also (in the proper and paid-for exercise of his calling was it?) to crawl along the tops of the carriages, in order personally to communicate with the parties sounding the alarm, and then, on thus personally ascertaining the urgency of the case, to cause the driver to stop the train, when instantly measures were taken, by telegraph and otherwise, to prevent the running of other coming trains until the child was found, which it accordingly very soon was, and was restored, too, almost entirely unhurt, to its proper owners. Necessity, therefore, may be said to be at least a helpful foster-mother to the simple invention which we have so perseveringly, but fruitlessly, thrust upon the notice of the public and the proper authorities; and we do hope at length to see either it, or something equally good, and as variously available, if that be possible, brought into practical maturity and general use. This very subject, of the communication between guards and passengers in cases of accident, we perceive, since writing the above, has been brought under notice in the House of Lords, when Earl Granville stated, in reply, that the attention of the Railway Commissioners had been directed at least to the subject of an increase in the number of guards [with reference, we presume, more particularly to additional power over a system of breaks in stopping trains in cases of collision], and that Captain Simmons, one of the inspectors, was instructed to communicate with Captain Huish of the North-Western, with a view to try some experiments. The subject, his lordship added, was one requiring the serious attention of every company, and was still under consideration. The commissioners, however, had no power to enforce any recommendation on the directors, and perhaps it was not desirable, as the responsibility of the latter might thus be, in their estimation, diminished. In fact, we wish his lordship had just hinted the propriety of *increasing* their legal responsibility a little, as we have so often suggested.

STRENGTH OF MATERIALS.

RAILWAY BRIDGES.

AT a late meeting of the Scottish Society of Arts, Mr. George Buchanan read a paper on the strength of materials, and their application in the construction of railway bridges. In regard to cast-iron, the result of extensive experiments was given, and it was found from the mean of sixteen different trials of English, Welsh, and Scotch iron, both hot and cold blast, that this material will sustain about 7½ tons, tensile strain, per square inch of section, before breaking, the weakest specimen being 6, and the strongest 9¾. The limit of fracture, however, can never be approached with safety, not even within a long distance, seeing that this material is liable to unseen imperfections, and, above all, to snap in a moment, without distending itself or giving any warning of danger. Malleable iron, again, is much superior in tensile strength, and by its remarkable ductility, inspires confidence in a still higher degree; it bears no less, on an average, by various experiments of Telford and Brown, than 27 tons—the weakest 24, and the strongest 29 tons—but before the half of this load is applied, it begins to stretch, and continues stretching up to the limits of fracture. It is, therefore, not only three times stronger than cast-iron, but may be safely loaded with five times the breaking weight, or about eight or nine tons.

In regard to the strength of compression, this depends also, as long as the length is limited, on the same element—the section of fracture; but when a long rod or slender pillar is loaded or compressed, it is liable to bend, not for want of strength, but for want of stability, the least flexure turning it off its centre, and breaking it by lateral force, deranging entirely the simple law applicable to short lengths. In regard to cast-iron, by far the most satisfactory experiments are those by Hodgkinson and Fairbairn. The mean result gives very nearly 50 tons on the square inch—the weakest 36½ tons, and the strongest 60 tons. It is thus six times stronger in compression than in distension; and hence it is peculiarly recommended for sustaining any superincumbent weight, as in the case of pillars and of bridges, provided the construction is such as to resolve the strain arising from the load into a longitudinal compression. This is often in our power by proper arrangements, chiefly giving a sufficient height and curvature to the arch; but in cases where, for the want of headroom, the arch is unduly flattened or resolved into a straight beam or girder, the danger is that we bring the tensile force into play, and then the use of cast iron is objectionable, or at least requires extreme caution. No direct experiments have been made on malleable iron of short lengths; but from some facts brought out by Mr. Hodgkinson, its strength appears much inferior to cast iron, chiefly from ductility, whereby it gives way much sooner under a load. It will bear 27 tons, probably much more, without fracture; but with 12 tons it yields to the load, contracts longitudinally, and swells out laterally; and this is another very important fact for our guidance in the use of those different materials. In regard to stone, experiments have been generally made on specimens rather too minute. Like cast iron, the crushing strength is superior to the tensile, and hence its adaptation for building, particularly bridges. Craigleith stone will bear 2½ tons on the inch, or upwards of 400 tons on the square foot; Aberdeen granite 600 tons. In regard

to bricks, he had occasion to make experiments in relation to the great chimney of the Edinburgh Gas-works. It became matter of consideration whether the ordinary brick could withstand the pressure of so lofty a column. Trials were therefore made with a powerful hydrostatic press, not on small specimens, but on the actual brick. The ordinary stock-brick was found to bear 140 tons on the square foot, and the common fire-brick 157 tons; but the brick of which the chimney is constructed, consisting of a mixture of fire-clay and iron-stone, bore, a single brick on its bed, no less than 140 tons—equal to 400 tons on the square foot.

The effect of the transverse strain was then considered and illustrated by various experiments and models. This strain is a compound of the tensile and compressive strain, the one part of a beam loaded in the middle being compressed and the other distended, and the beam itself becoming a lever, and acting often with enormous power against its own strength. Hence it became easy to calculate the strength, this being in every case proportional, in the first instance, to the area of the section of fracture, and this original modified by the length and depth of the beam, diminishing in exact proportion to the length, and increasing in proportion to the depth.

In a subsequent lecture, fully reported in the *Scottish Railway Gazette*, some interesting experiments were made on the tensile strength of stone from Hailes and Cragleith quarries. The Hailes stones bore on the square inch 360 lbs., the Cragleith considerably more; and a remarkable effect was observed here after the load had hung a little: it was suggested by a member to give it a slight tap with a hammer; and on this being done, it immediately snapped asunder, showing the effect of vibration or concussion when the materials are greatly strained, in aiding and completing the fracture—a circumstance which appears to throw light on what may sometimes occur by the rapid and violent action of trains on railways. The compressive strength of the Hailes and Craigleith stones was then shewn, by experiment, to be much greater than the tensile strength.

The compressive strength of posts and pillars was then considered, and the remarkable effects of the length of the pillar in diminishing its strength. On this subject much light has been thrown by the experiments of Messrs. Hodgkinson and Fairbairn. Pillars or rods were tried at different lengths, from 3 in. to 5 ft.; and of different diameters; rods ½ in. diameter, with 3¾ in. length, bore 11 tons; but, when the length was 7½ in. it only carried 5 tons; when 15 in. long, 3 tons; and, at 15 in., only 13 cwts. From these experiments a general rule may be drawn for different lengths. Taking the strength of cast-iron as formerly given at 50 tons per square inch, this will hold good in pillars till the length reaches five times the diameter, and then it begins to diminish. When the length is ten times the diameter, the strength is reduced in the proportion of 1¼ to 1; with the length at fifteen times the diameter, it is reduced as 2 to 1; twenty times as 3 to 1; thirty times as 4 to 1; and forty times as 6 to 1.

Hence the great advantage in cast-iron of using hollow pillars or tubes in place of solid metal, whereby, with the same area or section of fracture, the diameter of the pillar is increased, and with it the resistance to flexure, and an increase of strength in proportion to the length. A solid pillar, for instance, 6 in. in diameter, if extended to 7½ ft. in length, would be weakened one-half, but if cast hollow, 10 in. in diameter, and ¾ in. thick, giving the same weight of metal per ft, in length, it might then be extended to 12½ ft., and still possess the same strength as the other. In all these cases a remarkable circumstance was observed in regard to the mode of applying the strain. With the ends of the pillars turned flat, and a flat plate interposed at top and bottom, which is the case in supporting buildings, this was found to sustain nearly three times as much as when the pillar was rounded on the ends, so as to make the force pass directly through the axis, as occurs so frequently in machinery with the connecting-rods of steam-engines, and in other cases. The effect of the length of pillars in weakening the strength was illustrated by a striking experiment with a spiral wire, quite flexible, yet, when set up as a pillar, and tied in the middle latterly, with slender threads, carried a weight of 56 lbs., and would have carried much more, but the moment the threads were cut, the wire gave way by flexure, and oversetting the balance, the weight immediately sunk.

THE DRAINAGE QUESTION.

THE SEWERS, THE THAMES, AND PUBLIC HEALTH.

Sir,—Mr. Plum's scheme in THE BUILDER of June 3, for the drainage of London, "reads well," as some people say, but there are points in it which require explanation. In the first place, what does he mean by "the solid refuse of towns?" The contents of an ash-pit are solid when they enter it; but, in order to obtain anything like solidity in a cesspool, a vast quantity of fluid which enters it has to soak away or be evaporated. It is scarcely possible to imagine a case in which the refuse carried off from a house by a drain can be in any other than a decidedly fluid condition. In the next place, how is the effluvium from a street cesspool to be prevented entering the houses which drain into it? In the third place, how is that effluvium to be prevented escaping into the streets through the manhole? In the fourth place, how many air-tight carts, how many horses, and how many men are to be employed "in the night or early morn" to carry away the contents of these street cesspools? This is a question which requires a careful answer. When once the cesspools are nearly filled, the emptying process must go on as fast as the filling process. At a rough guess, is it too much to say that there must be 3,000 carts, 3,000 horses, and 4,500 men employed every twenty-four hours in this work? In the fifth place, how high must the tops of the exit air-pipes be in order to carry off the foul air, so as not to annoy the inhabitants of London? The highest chimney-shaft of any gas-works in London is too low to prevent the neighbourhood being annoyed by the product of combustion, whether smoke, or carbonic oxide, which issues from it. Mr. Plum does not "enter upon estimates," and, therefore, I do not touch on the question of expense. N. R.

We illustrated some time ago a cistern arranged to discharge at stated times a quantity of water into the house drains. Mr. Ashe, of Bristol, has recently patented an arrangement which has the same end in view. The inventor says:—"The apparatus is so constructed as to catch and hold all available waste water, until it amounts to about fourteen gallons, when the collecting vessel, being nearly full, suddenly overbalances, and throws the water with velocity into a conical basin, which conveys it into the eject or soil-trap, and from thence rushing through the house drain or sewer, leaves all clean and free from every nuisance."

THE CESSPOOLS OF THE METROPOLIS.

AT the last census in 1841 there were 270,859 houses in the metropolis. It is known that there is scarcely a house without a cesspool under it; and that very many old houses have two, three, and more under them; so that there may be taken to be 300,000 of such receptacles. The exposed surface of each cesspool, taken on an average, measures 9 feet; and the mean depth of the whole is about 6½ feet, so that each contains 58½ cubic feet of filth. The exhaling surface of all the cesspools (300,000×9)=2,700,000 feet, or equal to 62 acres nearly; and the total quantity of foul matter contained in them (300,000×58½) =17,550,000 cubic feet; or equal to one enormous cesspool 10 miles in length, 50 feet in width, and 6 feet 6 inches in depth; which would extend through London, from the Broadway, at Hammersmith, to Bow-bridge over the River Lea, a length of 10 miles. If such a gigantic cesspool of filth were to be seen, it would fill the mind with horror; but, as is shown above, a vast number of small ones, which, added together, equal it in extent, is dotted all over the town—in fact, it may be said, that the ground, in old districts more particularly, is literally honeycombed with the barbarous things. From them a nasty, stinking, pestiferous vapour is constantly escaping, corrupting the atmosphere from one end of London to the other, and creating disease, misery, poverty, and other evils among the inhabitants. J. P.

New Books.

Lessons on the Delineation of Form, intended to be preparatory to Elementary Writing, or Outline Drawing. By the Rev. CHARLES RICHSON, M.A., Clerk in Orders of the Cathedral, Manchester. With an Introduction, by GEORGE WALLIS, late Head Master of the Manchester School of Design. Darton and Co., Holborn-hill.

Fifty Diagrams, to illustrate the Delineation of Form, adapted to the Author's Lessons on the same subject. By the Rev. C. RICHSON. With a Preface, containing Hints to Teachers on the Early Education of the Hand and Eye. By GEORGE WALLIS. Darton and Co.

WE have long and earnestly, as is well known, advocated the propriety and advantage of making the elements of drawing as general and primitive a branch of established and ordinary education as the elements of writing, to which drawing is much akin. And we are well assured that most of our habitual readers will rejoice with us to observe, from the titles of the little works just quoted, that our idea is at length on the likely way to a practical realization. Every one with the slightest acquaintance amongst the Lilliputian generation, must be well aware that an ambition, a positive itching, for pencil and paper, or their equivalents in any shape, however *mal-apropos*, forbidden, or inconvenient, is a characteristic feature in the intellectual constitution of nine-tenths of the whole of that interesting little class of men, and that the *delineation of* FORM, in the exercise of which they so much delight, and in the seizing of all sorts of opportunities for the display of their pride in which, they are so eager and unscrupulous, only requires the guiding hand of experience to reduce it, in multitudes at least, if not in all, to intelligibility, taste, and elegance. Here is the impetus, the steam, the locomotive, and we only want the lines, the grooves, in which it is desirable we should lead it onward to its useful destination.

In the joint productions of Mr. Richson and Mr. Wallis, there are both tact and delicacy of handling, well adapted to the tender faculties to be cultivated; and it is really interesting—we had almost said amusing—to observe the simplicity through which the young idea is fairly cajoled into the unconscious rudiments and forms of all the stern profundities of geometric lore. These truly rudimentary books, together with Mr. Wallis's forthcoming work on "The Early Education of the Hand and Eye, as applied to the Home Instruction of Young Children in the Art of Drawing," will be all-sufficient, we should think, in connection with such somewhat less rudimental or more advanced elementary books as that of Mr. Butler Williams, in teaching the imitative use of rigid and solid models, outlines of form in wire, &c., completely to accomplish the useful purpose which we have so long laboured to originate. In the words of Mr. Wallis, in his Introduction to the first of them, the two great objects in education which the little works now under notice are designed to achieve, are, to "*lay the foundation of a power to* DRAW, whilst disciplining the hand and eye in the requisite elementary *practice of linear construction as applied to* WRITING;" and we certainly think them extremely well adapted to carry out, practically and successfully, the end in view. Every national school,—every school, in fact, for ordinary instruction, ought to make, and we trust ere long will make, good and daily use of them; and as to schools for the poor in particular, the recent measures of Government, in introducing an efficient class of assistants, must now be removing the only remaining obstacle to, or excuse for the neglect of, this important subject.

Facts and Figures, principally relating to Railways and Commerce. By SAMUEL SALT. Longman and Co.

THIS is an interesting and useful little collection of extracts from newspapers, speeches, and minutes of evidence, bearing chiefly on railways, and which would otherwise be gulphed and known no more.

Correspondence.

FULHAM WORKHOUSE COMPETITION.

SIR,—I have some faint recollection (merely the ghost of one) of having, in the month of February last (above *sixteen weeks ago*), sent in some competition drawings for a workhouse, which was intended at that time to be erected at Fulham, and also believe that above thirty architects did likewise.

Not having since had either the drawings returned, or any notice as to the award of premiums, and as the thing occurred so very long ago, I may perhaps only have been *dreaming*, but yet it appears to me quite plain that I saw an advertisement from the Guardians, in which they stated that they would give premiums for the three most approved designs, and that "they would adjudicate on the plans, &c., on the 16*th day of March*." The 16th of March? let me see: does that come before or after the 21st of June—methinks it comes before—what do you say, Mr. Editor?

I feel rather sleepy still: perhaps you can inform me if it be true that the competitors are all, with the exception of *one* only, going to have a meeting (the place of which now only remains to be settled), to decide upon the best plan of entering into a vigorous competition (in the shape of a *prosecution*) *against the Guardians*, for obtaining so many valuable drawings under false pretences. A clear case will be made out, without a doubt, against them, when the whole affair is properly sifted by gentlemen of another profession.

I am, Sir, &c.,

A PATIENT COMPETITOR FOR THE FULHAM WORKHOUSE.

Miscellanea.

PROJECTED WORKS.—Advertisements have been issued for tenders, by 8th July, for the erection of a savings bank at Saffron Walden; by 1st July, for the erection of certain buildings, &c., for the Hollingbourn Union; by 7th, for the repair of twelve houses at Bethnal-green; by 1st, for the erection of schools and master's house at Portswood; by same date, for the erection of school-house and master's dwelling at Isleham; by 11th, for the erection of a circular engine-shed, 150 feet diameter, at the Leicester station of the Midland Railway; by 1st, for bricklayers', joiners', stonemasons', slaters', plumbers', and painters' work on the estates of the Hull Trinity-house; by 29th June, for a supply of 30,000 Canadian larch or hacmatac sleepers for the London and North Western Railway; by same date, for supplying and laying down pavement on the marsh roads, Southampton; by 5th July, for repairing and paving footways and carriageways in Westminster; by 3rd, for the supply of 50,000 cubic feet of dressed granite for Plymouth Breakwater; by 28th inst., for a supply of ironmongery for the East-India Company; and by 27th inst., for painting the market-hall and fish-hall, Birmingham.

THE WORKS IN WESTMINSTER ABBEY.—Sir,—I have just returned from a visit to Westminster Abbey. Although I did not approve of the plan of the alterations when it was first mooted, I find the general effect produced by them is better than I thought it would be. I still think, that, cumbered as the north transept is with monuments, grossly unfit, by their size and character, to stand among those beautiful arches, it would be better to shut that transept out of view from the poet's corner altogether; to say nothing of ecclesiastical objections to opening it. However, since it is thrown open, there is a comfort in thinking that, as these evidences of bad taste are brought more fully before the view of the public, it may lead to their removal the sooner, by the early provision of some suitable national receptacle for the Mansfield and other monuments. I agree with you in thinking the carving of the stalls and organ screen excellent: it reflects great credit upon the artists. But I am rather disappointed with the colour of the wood: it is too light, and does not, in my opinion, harmonize with the character of the building on that account: surely it would be far better if stained a deep brown oak colour like the carving in York Cathedral. E. A.

MONUMENTS FOR CANTERBURY CATHEDRAL.—Mr. Edmund Richardson, the sculptor, has completed two monuments to those of the 31st and of the 16th Lancers who fell on the Sutlej, and which are to be placed in Canterbury Cathedral. The first consists of a centre panel, 3 feet by 3 feet 6 inches, containing inscriptions (203 men having fallen, besides officers); the pediment or upper member, the tattered flags of the regiment as they came out of Sobraon, an enemy's gun on carriage, &c.; the side or wing pieces, the Sikh flags and other trophies taken; and the plinth or lower member, the Sutlej medal, and a branch of laurel and cypress. These, with an upper and lower moulding, are in white marble, placed on a dark marble ground, and relieved, at the corners, by the words *Moodkee*, *Ferozeshah*, *Aliwal*, *Sobraon*, in bronze scrolls. The monument is 6 feet in height and width, and the relief various.—That for the 16th Lancers, which exceeds in size the former, being 8 feet high by 5 feet 6 inches wide, contains, in a centre panel, 4 feet by 3 feet 6 inches, an alto-relief of a wounded officer resting against a palm-tree, tended by one of his troop, who has dismounted, and with the lance in one hand, is offering with the other water from his flask, the horse standing by his side. A Sikh helmet, with gorget of chain-mail near, shews the conflict his officer had encountered. On the moulding below is *Aliwal* in raised letters; and on plinth, which rests on two laurelled trusses, the inscription,—To those of the 16th Lancers, who fell in the discharge of their duty, in the Sutlej campaign;—the names of the killed being placed in two broken columns, with cypress wreaths suspended, one on either side of the centre panel. Above the panel is a moulding and pediment, which last contains the regimental devices, the Guznee and Sutlej medals, and Maharajpoor star, and motto,—*Aut cursu, aut cominus armis*. The monument is relieved by a dove-marble ground.—Ably as these monuments may be executed, we are bound to say the designs ought, in our opinion, to have been very different in character for the proposed situation.

STATE OF RAILWAY QUESTION AND OF TRADE, &c. AT PARIS.—The Government project of taking possession of the railways has been under the consideration of Committees of Finance and of Public Works. The latter proposes that the amount of the indemnity offered by the Government in *Rentes* should be regulated, not by the average price for the six months, but for the twelve and eighteen months preceding 24th February. The former, admitting the right of the Government to seize the railways "as an expropriation for public utility"—decided that the Minister of Finance had not shown sufficient grounds to justify him in taking immediate possession of them, and unanimously disapproved of the terms offered to the companies. For example, the Government would gain [or in fact, without giving any equivalent, confiscate and seize] from the Tours and Nantes Company 11,000,000f. and 15,000,000f. ready cash from the Paris and Strasburg Company's works, which cost the company 18,500,000f. The committee further objects that, in consequence of the state of the finances of the Government, it would be inexpedient to purchase the railroads, and proposes, in conclusion, the rejection of the Government project altogether.——The diminution of confidence and trade in Paris, and France at large, has been already but too plainly proved by statistical details occasionally given in THE BUILDER. The same lamentable result of the past and present events is attested in the *Constitutional*, by the fact, that a country shopkeeper, who had been tempted to risk some 60*l.* in the selection and intended purchase of a lot of bronzes in Paris, and was in the act of handing over the money, only required to hear the admonitory sound of the eternal *rappel*, followed forthwith by the *generale*, to recal his mind to his prudential senses, his frank pieces to his breeches pocket, and his endangered person to his native province. More than twenty manufacturing jewellers, who have not disposed even of the smallest article of their trade ever since the eventful 24th of February, have resolved to shut shop and also retire to the country for the present.——The National Assembly and the Executive have appointed "a council of *prud'hommes*, to settle all differences between employers and their operatives."——The Committee appointed by the assembly to report on the demand of 3,000,000 francs (120,000*l.*) for the support of the national workshops, has unanimously resolved to adopt efficacious measures to put an end entirely to the waste of money in these workshops.——The examination into the state of the *Ateliers Nationaux* has already led to the discovery that there were 25,000 false names on the list of the workmen employed, which, at the rate of two francs a day, amounts to 2,000*l.* sterling a-day, "which went into some person's pocket."

PROTECTION FROM FIRE.—On Tuesday, the 20th, a deputation from a public meeting held in the parish of St. Pancras, on the subject of protection from fire, had an audience with Sir George Grey, at the Home Office, which lasted three-quarters of an hour, and may, it is hoped, lead to important results in a matter so closely allied to comfort and safety. Sir George expressed an opinion that there can be no doubt as to the utility of the fire-escapes, which have already saved sixty lives in London, and the accounts he has had of the new invention (the annihilator), make it very desirable that its claims should be fairly investigated, and if there is a necessity for amending the Act of 1774, it ought to be done to enable parish authorities to avail themselves of the improvements of the age. The fire annihilator is a small machine of the size of a common pail, containing several iron encaissments, and in the middle 7 lbs. of nitre, carbon, and gypsum, in the proportions of six, two, and two, and also one quart of water; at a touch of the finger on a small piston, charged with a small quantity of chlorate of potass and sugar, the compound is in a moment converted into steam to an amount so enormous, that it equals the quantity produced by a five-horse steam-boiler, and is equivalent to a brigade fire-engine. The whole machine can be made for 1*l.*, of which the combustible spent is worth only 14d. Its mode of extinguishing a fire appears to be by the steam, emitted in a dense column on the lower part of the flame, or on the ignited combustibles, cutting off instantly the supply of oxygen, and the momentary vacuum being followed by a rush of cold air. The proportion of heat is thus reduced below the flame temperature, and, if the quantity of heat be not very intense, scarce a spark will escape being smothered. Experiments to the extent of the debris of several tar-barrels, sprinkled with turpentine, have been made with good effect—a flame 30 feet high being put out, as if by magic. A further test will soon determine its powers. Lord Dudley Coutts Stuart, as chairman of the public meeting, headed the deputation, with Sir Benjamin Hall, M.P., the churchwardens of St. Pancras, Mr. Geo. Foggo and other gentlemen.

THE SUBTERRANEAN FIRE below the village of Lower Haugh, near Rotherham, which originated about twenty years since in the coal, at a point where it rose to the surface, is still burning, and the fear of the villagers as to the ultimate fate of their dwellings still prevails, and is occasionally increased, indeed, by the sinking of foundations and the rending of walls. The Wentworth Mausoleum had to be isolated by severing the coal bed by a special shaft. Meantime, however, although the evil is rapidly on the increase, and the heat and sulphur are in some places intolerable, the villagers are prudently making the most of it, by the conversion of "large tracts" of land into "one huge hot-bed, where the heat is not so intense as to destroy vegetation altogether." Fine winter quarters these!—another Madeira for invalids, indeed—were it not for the sulphur and the insecurity. Smoke and flame have even occasionally to be kept under "by puddling the eruptions with clay!

INSTITUTE OF BRITISH ARCHITECTS.—At a meeting of the Royal Institute of Architects, held on Monday, the 12th inst., Mr. Sydney Smirke, A.R.A., in the chair, the Rev. Richard Burgess, B.D., read a very interesting paper on "the Theatres and Porticoes of Ancient Rome." We shall give it at full length in an early number. The closing meeting of the session will be held on Monday evening next, when Professor Willis will read a paper on "the Triforium of the Medieval Churches."

TENDERS

For rebuilding a farm-house and offices at Wyfield, near Newbury. Mr. Money, of Donnington, Surveyor.

Dredge, Newbury	£1,285 0 0
Balding, ditto	1,278 12 0
Adey, ditto	1,262 0 0
Underhill, Chelsea (accepted)	1,232 0 0

For alterations and repairs, and painters' and decorators' work, to be done to the Foundling Hospital Chapel, under the direction of Mr. Henry Currey, architect.

Hutchinson and Co.	£2,136
Hicks	2,115
Cooke	2,054
Winsland and Co.	1,999
Foord and Sons	1,979
Kelk	1,855
Cubitt and Co. (accepted)	1,850

MEETINGS OF SCIENTIFIC BODIES

Held during the ensuing week.

MONDAY, June 26.—Institution of Architects, 8 P.M.

TUESDAY, 27.—Institution of Civil Engineers, 8 P.M.

TO CORRESPONDENTS.

"*Stain for Compo.*"—A correspondent says,—"I have a large surface of cement to the exterior of a mansion that I wish to stain; an objection is made to the ordinary colouring, and to paint, and it is considered that both might be superseded by a stain that would contain sufficient colouring matter to give the appearance of stone of a warm buff tint. If you will kindly insert this in your valuable periodical, some of your numerous correspondents may possibly afford me some information."

"*W. W.*"—We are unable to reply without seeing some specimens.

"*R. W.*"—Our correspondent "W. C." denies the truth of Mr. Wyld's statement. A re-assertion is no proof.

"*W. O.*"—We are compelled to adhere to our constantly repeated statement, that we have not time to find addresses or advise as to books.

Received.—"Philocriticus," "E. L. T.," "P. S.," "R. F.," "R. C. D." (Send us the particulars). "N.," "J. R.," "M. P.," "Baron," "B. H.," "Inquirer." (Will find reply in present number). "T. S. Y." "The Young Surveyor's Preceptor, a Clear and Comprehensive Analysis of the Art of Architectural Mensuration;" by John Reid, Surveyor: Bascvi, 11, Drake-street, Red Lion-square.

ADVERTISEMENTS.

CAEN STONE, from the first Quarries of Allemagne. Depôt at the Whitby and Scotch Wharf, 14, Fore-street, Limehouse.

P. FOUCARD, quai des Abattoirs Caen (propriétaire de Carrières à Allemagne), begs leave to inform Builders, Architects, and others, that he has, on the above-mentioned wharf, 50,000 feet of the best stone ready to meet the demands of purchasers.—Contracts taken for any quantities.

Orders received by Mr. BASSHET, at 39, Stoney-street, Borough Market,—Cargoes shipped to order, from Caen, to any port.

CAEN STONE.—LUARD, BEEDHAM, and Co. beg to inform Architects, Surveyors, Merchants, Builders, and others, they are importing, by large and frequent shipments, CAEN STONE of the BEST QUALITY, from their Quarries at Allemagne, quarried during the late season.

L., B., and Co., invite inspection of persons capable of judging of its quality, at their depôt, Caen Wharf, Rotherhithe.

Orders executed with dispatch to all parts of the United Kingdom.

Office, 18, Southwark-square, near Southwark-bridge; Depôt, Caen Wharf, Rotherhithe; and Sur le Quai, a Caen, Normandy.

BUILDERS, MASONS, &c., will realise a great reduction in the COST of MARBLE WORK, by sending their orders to the WESTMINSTER MARBLE COMPANY'S WORKS for Working and Polishing Marble by Patent Machinery.

The Trade will find a great advantage from this Establishment equal to the cost of the labour, as Vein Marble Chimney-pieces are sold at the small charge of 30s. each, which will enable the Mason to realise a great Profit: also a liberal Commission to Persons acting as Agents, for Monuments and large Chimney-pieces.—Direct, Westminster Marble Company, Earl-street, Holywell-street, Millbank, London.

SAMUEL CUNDY, Mason and Builder, PIMLICO MARBLE and STONE WORKS, Belgrave Wharf, Pimlico, begs to inform Architects and the Public that MASONS' WORK, in all its branches, is executed on the most reasonable terms, in such manner as must meet the views of his Patrons.

GOTHIC WINDOWS and the more elaborate Works produced at a reduced cost, on a system that combin es economy with the required accuracy and truthfulness.

FONTS from 5£ upwards.

MONUMENTS and TOMBS in great variety of design.

The most varied Assortment of ORNAMENTAL, PLAIN, and ENCAUSTIC TILES, in Town, on view.

Stone-box Chimney-pieces, from		12s.
Vein-Marble	"	40s.

RESTORATIONS Estimated for (in which Branch S. C. has had considerable practice). Dairies fitted up, &c. &c.

Goods Landed, Housed, and Delivered.

ANSTON STONE, used for Building the New Houses of Parliament.—W. WRIGHT and Co. beg to inform Architects, Engineers, Builders, and others, the Anston Stone can be supplied in any quantity on the shortest notice. This valuable stone, so celebrated for its durability, colour, and texture, is well known, having been selected in preference to all others, by the Commissioners of Woods and Forests, for building the New Houses of Parliament. It is very superior for Monuments, Tombs, &c. &c. Facilities are at hand for forwarding it to all parts of the Kingdom.—Application to be made to W. WRIGHT and Co., Anston, near Sheffield, Yorkshire.

ANSTONE STONE, used in the erection of the NEW HOUSES OF PARLIAMENT.

Mr. GRISSELL has the honour to inform Architects and gentlemen engaged in Building, that in consequence of having nearly completed the above works, he is at liberty to supply the Anstone Stone for building purposes in general.

The price at which it can be delivered in London does not exceed the price of Portland stone. As to quality and colour, the experience of the past seven years will fully attest its superiority.

It is also preferable for staircases and rubbed landings, for which purposes it can be supplied in any sizes; and as regards cost (with the exception of common paving), it is not more expensive than "York."

In addition to the New Houses of Parliament, Mr. Grissell takes leave to refer to the Museum of Economic Geology, just erected in Piccadilly; to the Amicable Assurance Office in Fleet-street; and to the New Hall in Lincoln's-Inn-fields.

Mr. Grissell desires also to state, that the stone, which he has now the honour for the first time to offer to the public, and which has been used exclusively in the above works, is from the estate of his Grace the Duke of Leeds, and that Mr. Grissell alone possesses the right of quarrying this stone.

11, New Palace-yard, Westminster.

ARCHITECTURAL CARVING COMPANY, Eccleston-place (late Sir F. CHANTREY'S Foundry), Pimlico, respectfully direct the attention of Architects, Builders, and others to the facility afforded by their Machinery for carrying out with dispatch and accuracy, and at a great saving in expense, the most elaborate Designs in Wood or Stone.—Specimens may be seen and Estimates obtained on application at the Premises.

PAVING, 2s. 9d. PER SQUARE YARD, Basements, Foot-walks, Malt-houses, Corn Stores, Floors of Warehouses, and every description of Pavement laid down at the above low price, and the work guaranteed.—Apply to JOHN PILKINGTON, POLONCEAU'S BITUMEN PAVEMENT OFFICE, 18, WHARF-ROAD, CITY-ROAD.—N.B. Country Agents and Railway Engineers and Contractors supplied with the best bitumen for covering bridges and arches.

ROCKHILL PAVING STONE.—Shipped direct from the quarries in Caithness, or from Mallcott's Wharf, 336, Wapping, on application to ALEXANDER DUNN, 11, Savage gardens, Tower-hill.—Landing, ex "Ebenezer," a cargo, class No. 1?, in 6 feet, 4 feet, and 3½ feet courses.

MAGNUS'S ENAMELLED SLATE.—Under the patronage of Her Majesty, Prince Albert, the Duke of Wellington, and the principal of the Nobility, the most eminent Architects, Builders, &c. &c.—This beautiful material has been introduced into Buckingham Palace, the drawing-rooms at Osborne, Apsley House, Strathfieldsaye, &c. &c., and it is now taking the place of marble in the mansions of the nobility generally. It is also extensively used in Government offices, the principal railway stations, and other public buildings. It can only be distinguished from real marble by its superior brilliancy of polish, and it is more durable, and less liable to chip at the edges, than marble. The choicer productions, such as black and gold, sienna, jasper, verd antique, jet black, &c. are not more than one-third of the price of marble. Among the articles manufactured at the Pimlico Slate Works are chimney-pieces, consoles, billiard and table tops of all descriptions, pedestals, pilasters, columns, plinths, tazzas, mural tablets, baths, wash-stand tops, &c. &c. Cisterns, dairy shelves, flooring and plain slate-work in general executed on exceedingly moderate terms. Welsh slate slabs, of the finest description, at very reduced prices.—N.B. The trade supplied with whole cargoes, self-faced, or planed on one or both sides, direct from the quarries.—A book of prices will be forwarded on application to Mr. MAGNUS, Pimlico Slate Works, Upper Belgrave-place, London.

JENNINGS, Patentee of the SHOP SHUTTER SHOE and FASTENER, which requires NO BAR; of the INDIA RUBBER TUBE COCK, PATENT JOINT, &c. &c.—29, Great Charlotte-street, Blackfriars'-road.

SNOXELL'S PATENT SAFETY REVOLVING WOOD SHUTTERS, Manufactory, 98, REGENT-STREET and 131, CHANCERY-LANE. Patent sealed on the 4th day of February, 1845, for Fourteen Years, for Improvements in Revolving Shutters of WOOD and IRON, consisting of Six Methods of Raising and Lowering Shutters, without Machinery, and Two for Hinging and Sheathing the Edges of Wood Laths with Iron.—The Patentee having fixed up some hundreds, will feel pleased in forwarding the Testimonials of Architects, Principals of large Establishments, and others, having them now in use, which fully guarantees the Patentee in stating they are beyond dispute superior to any other Revolving Shutter for durability, security, and simplicity, without the use of cog-wheel worm and screw gear, or any other complicated machinery employed by other makers.

MESSRS. HOPKINS and Co. solicit the attention of Architects, Builders, Upholsterers, and the Public generally to their REGISTERED SELF-REGULATING BLINDS, which, dispensing entirely with the centre line, is peculiarly suited to French casements and high windows. OUTSIDE SUN BLINDS ON IMPROVED BALANCE ACTION.

H. and Co. are the sole manufacturers of BARRON'S PATENT METAL GROOVE ACTION, contrived for the easy and noiseless carriage of curtains on Brass or Wood Poles. This action has been much used, and with invariable success for octagon, bow, and other shaped windows. Models constantly on show.

HOPKINS and Co., late James Barron, Window Blind Manufacturers, Cabinet and General Brass Founders, 40, Castle-street, East, Oxford-street, London; and at Birmingham.

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Beg respectfully to solicit a comparison with the Revolving Shutters (either iron or wood) of any other Makers, whatever their pretensions. The extraordinary demand, arising from the universal satisfaction given, for BUNNETT and CORPE'S PATENT REVOLVING SHUTTERS (of which some thousands have been fixed in all parts of the Kingdom), having induced other parties to attempt the introduction, by the most absurd representations, of sundry old and discarded inventions as Improvements, B. and C. assure their Friends and the Public that, during their most extensive use, they have adopted every really practical improvement that skill and experience could suggest. A great reduction has also been made in the price, and they are now much CHEAPER, as well as BETTER, than any others.

The prices of the Patent Metallic Sash Bars, &c. have been revised and reduced; Shop Fronts, &c., completely fitted and fixed in a superior style, either plain or ornamental. Strong drawn moulded stallboard plates handsomely engraved. Shop Fronts, &c., completely glazed with best plate glass.

SKYLIGHTS manufactured to any design or extent in Wrought or Cast-iron, Copper, or Zinc.

B. and C. are also sole licencees for MARVIN and MOORE'S PATENT DIAGONAL GRATINGS, for areas at shop fronts, for shop, warehouse, and balcony floors, &c., which does not obstruct the light, yet admits of Ladies walking over or standing on the same.

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Manufacturers of Improved Steam Engines, Sawing and other machinery, especially adapted for builders' purposes, which may be seen in operation, daily, at the Works, Deptford, Kent.

Estimates given, and Contracts taken, in town or country. Patterns, and every particular may be obtained, on application at the Office of the Patentees, 29, Lombard-street, London; and at the Works, Deptford, Kent.

PATENT CONVEX REVOLVING IRON SHUTTERS, recently manufactured, under license, by the late firm of R. HOWARD and Co., Old-street.

HARCOURT QUINCEY, Patentee.

CLARK and Co., Manufacturers, beg to call the attention of Architects, Builders, and others, to the IMPORTANT IMPROVEMENTS in the above Shutters, and inspection invited at their Manufactory, 238, Wapping, or at their Agents, 456, New Oxford-street. The great importance of strength and stiffness in the laths of REVOLVING IRON SHUTTERS, in affording increased security, is obvious, and it is only necessary to point out the fact, that the patent convex laths are twelve times stronger than the ordinary flat laths, to insure their general adoption.

CLARK and Co. also invite attention to their greatly improved gearing, for raising and lowering the patent Shutters, which, possessing all the advantages of the endless screw (worm and wheel), cannot, even by wear, be liable to run down, and entirely avoids the necessity of using the ratchet-wheel, and is at once simple and thoroughly effective, and is SAFER and MORE DURABLE than any plan yet adopted for that purpose; thus rendering the Patent Revolving Shutters the SAFEST and MOST EFFECTIVE in use. These Shutters are fixed horizontally (either above or below the window or door), or vertically, for which position the greatly increased strength of the convex laths renders them peculiarly suitable; and one, as applied to a doorway, may be seen any day after Four o'clock at the Britannia Life Assurance Office, corner of Princes-street, Bank.

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NAILS, and every description of Builders' IRONMONGERY, supplied at the lowest Birmingham Prices, by FREDERICK BLYTH, Patent Cut-Nail Manufacturer and General Factor, Edmond-street, Birmingham.

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CAST-IRON PIPES, IRON WORK FOR OVENS, &c.

RAIN PIPES, &c.—F. A. TIDDEMAN, Purfleet Wharf, Earl-street, City, near Blackfriars-bridge, keeps a large stock of Rain Pipes, Heads, Shoes, Elbows, &c., half round and O. G. Gutters, Socket Pipes for Water or Gas, Flanch Pipes, Sash Weights, and other Castings; Iron Work for Baker's Ovens of every description, fitted complete, to be had in sets or in parts.—Prices equal to all competition. Contracts taken to any extent.

TO GAS COMPANIES, Gas Fitters, and Gas Consumers.—N. DEFRIES, 10, Hampstead-road, 67, St. Martin's-lane, and 118, Argyle-street, Glasgow, having proved by eight years' experience his DRY METER to be unrivalled, begs to say, that nearly 20,000 are now in use, defying injurious Gas, and are never affected by Heat, Damp, or Frost. They may be obtained on Hire of all the Gas Companies who supply Meters to their Customers.—Testimonials of great value may be obtained at either Factory.

J. MEACOCK, GAS FITTER, LANTERN MAKER, and METER MANUFACTURER, No. 7, Snow-hill, London, late of No. 71, Snow-hill, begs respectfully to inform Carpenters and Builders, and the Public in general, that in consequence of his increasing business, he has been induced to take the above extensive premises, and having purchased Machinery at considerable cost for the manufacture of Metal Sash Bars and Stall Board Plates, is enabled to offer them a considerable reduction of the present prices.—Estimates given to any amount for the above, in Town and Country.

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Register Stoves, 6d. per inch.
Elliptic Stoves, 2½d. per inch.
Cottage Range, with Oven and Boiler, 3 ft., 35s.
Self-acting Range, with Oven and Boiler, bright fittings, 3 ft. 6 in., 3l. 10s.
Drawing-Room Fenders 14s. each, usually sold at 1l. 1s.
All Goods Warranted.

J. and J. Hartill are Ironfounders, Fender and Fire-iron Manufacturers at Dudley. Established 1825.

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JOHN GRICE most respectfully solicits the attention of Architects, Builders, and Carpenters, to his Stock of Black and Bright Stoves, Kitchen Ranges, &c., &c.

Black Registers, from 6d. per in. and upwards.
Bright ditto with Black and Bright Bars, 9l. 10s. and upwards.
Self-acting Kitchen Ranges, with Oven and Back Boiler, Wrought Bars, Fittings Bright:—

3 ft.	3 ft. 6 in.	4 ft.
3l. 3s.	3l. 14s.	4l. 5s.

All articles made on the premises and warranted, and delivered free of expense within five miles of London. Bell-hanging in superior style, hung in secret, 8s. per pull.

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Strong Self-acting Kitchen Ranges, with Back Boiler and Oven, and Wrought Bars:—

3 ft.	3 ft. 3 in.	3 ft. 6 in.	3 ft. 9 in.	4 ft.
£3. 6s.	£3. 13s.	£3. 16s.	£4.	£4. 7s.

Henly's Patent Improved, with back Boiler and Wrought Iron Oven:—

3 ft.	3 ft. 3 in.	3 ft. 6 in.	3 ft. 9 in.	4 ft.
£3.	£3. 15s.	£3. 5s.	£3. 10s.	£7.

Best Register Stoves, at 7d., 8d., and 9d. per inch.
Do. Elliptic do., at 3½d., and 4d. do.

Manufacturer of WOLFASTON'S PATENT REGISTER STOVES, a certain cure for SMOKY CHIMNEYS, and effecting a great saving in fuel. To be seen in use daily.

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Self-acting Ranges, with Circular Oven and Back Boiler, best Wrought Bars and Bright Fittings,

3 ft., £3. 3s.	3 ft. 6, £3. 12s. 6d.	4 ft., £4.

Best Patent Cut Clasp.

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4s. 3d.	5s.	6s. 6d.	7s. 6d.	10s.	12s. per gross.
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BURBIDGE and HEALY, 130, FLEET-STREET, LONDON, beg respectfully to inform the Building Public that they fit up COOKING ARRANGEMENTS for large Mansions, with patent appliances on scientific principles, which ensure greater economy and efficiency than hitherto attained. Also HOT WATER APPARATUS, upon improved and scientific principles, which they recommend for its peculiar safety for the Warming of Mansions, &c.

They fit up Laundries with Hot Water Apparatus, for Drying in a speedy, expeditious, and safe manner. They also fit up BATHS with elegant arrangements, with every modern scientific improvement. Also Apparatus for the plentiful supply of Hot Water for Baths and general use of Mansions and large establishments.

ARCHITECTURAL ENRICHMENTS.

BIELEFELD'S IMPROVED PAPIER MACHE, which has been almost universally adopted for architectural decoration, has been patronized by her Majesty, by the Honourable Commissioners of Board of Works, by the highest of the nobility and gentry, and by the most eminent architects of the day. It has been used at the royal palaces, at the present House of Lords, at Dublin Castle, at Drayton Manor, the new Conservative Club House, Grocers' Hall, &c., also at the British Museum and Pantheon Bazaar, where it has been extensively used for some years, and an inspection will sufficiently establish its superiority over every other kind of composition, both for beauty and durability. Designs prepared for the decoration of ceilings, panelling of walls, &c. A volume of enrichments, containing more than 1,000 designs of the papier mâché ornaments, with a tariff, price £1.—Works, 15, Wellington Street North, Strand.

PREPARED FLOORING BOARDS.

AT REDUCED PRICES.

ALWAYS ON SALE, a Large Assortment of DRY PREPARED FLOORING BOARDS and MATCHED BOARDING of all sorts, planed to a parallel width and thickness, from ¼ inch to 1¼ inch thick.

TIMBER, DEALS, OAK PLANKS, SCANTLINGS, SASH SILLS, &c.

Apply at W. CLEAVE'S Timber Yard, Wilton-road, Pimlico, late of Great Smith-street, Westminster.—Mouldings prepared by machinery.

ALFRED ROSLING begs to inform the Trade and Consumers generally, that he keeps constantly in stock a large and very general assortment of Prepared Floor Boards and Matched Boarding, planed to a parallel breadth and thickness, and fit for immediate use; also a variety of machine-prepared Mouldings, which are finished with great accuracy and attention to quality of workmanship.—Southwark Bridge Wharf, Bankside, and Old Barge Wharf, Upper Ground-street, Blackfriars.

T. ADAMS (late S. DARE), MAHOGANY and TIMBER MERCHANT, Bermondsey New Road, near the Bricklayers' Arms. SEASONED FLOORING, MATCH-BOARDING FIT FOR IMMEDIATE USE, and MOULDINGS prepared by machinery. Cut Deals and Scantling of every dimension, Mahogany, Cedar, Rosewood, Wainscot, Elm, Beech, Oak, &c., in planks, boards, veneers, and logs; Pantile, Oak, and Fir Laths; Wheelwrights' Goods. All sawn and prepared goods delivered free of expense (except timber). Sawing charged at mill prices. Very extensive Drying Sheds.

N.B.—T. A. has several Lots of Dry Cut Stuff to sell at reduced prices for cash, previous to stock-taking at Midsummer.

MUIRS PATENT PLANING MACHINE.

SAW MILLS, GILLINGHAM-STREET, PIMLICO.

TIMBER of any size, PLANK, DEALS, and BATTENS, &c., Sawn on the most approved principle. Boards, &c., Prepared, Matched, and Grooved, by Muir's Patent Machinery. The Mills have all the advantages of navigation and water-carriage, being connected with the Thames by the Grosvenor Canal. Goods fetched from the docks and carted home free of charge.

Address to HENRY SOUTHAM,
Saw Mills,
Gillingham-street, Pimlico.

N.B. Estimates given for Sawing and Planing.

JOHN NEWSON'S Machinery being now perfectly completed, he is enabled to offer to Builders and others the BEST DRY FLOOR BOARDS at the following reduced prices:—

¼ white S	15s.	per 100 feet	superficial.
1 inch ditto	18s.	"	"
1 inch white D	23s.	"	"
1 inch yellow	24s.	"	"
Two-cut battens white or yellow	21s.	"	"

All sorts of sawing done for the trade, and room to stack and dry upwards of 20,000 deals and battens. Barges always going to and from the principal docks. Goods can be insured in the Builders' Fire Office, 69, Lombard-street, or at Mr. Newson's Office, 80½, Westbourne-street, also at his Timber Yard, Grosvenor-row, Pimlico.

WOOD THOROUGHLY SEASONED in DAYS instead of YEARS, by DAVISON and SYMINGTON'S PATENTED PROCESS, at the Patent Desiccating Company's Establishment (for Seasoning, Sawing, and Planing Wood), at the Grand Surrey Mills, immediately adjoining the Commercial and East Country Docks, Rotherhithe. The new process ensures the entire removal of moisture, hardens the gums, prevents further shrinkage, and strengthens the fibre.—For scale of prices, or license to work the patent, or any further information, address, post-paid, or apply to W. H. TANQUERAY, Secretary.

The Patent Desiccating Company's Offices are REMOVED from 28, New Broad-street to No. 41, GRACECHURCH-STREET, CITY.

OAK POLES.—FOR SALE, a Quantity of this year's Oak Poles, fit for fencing, spokes and rough buildings, now lying on the land purchased as a site for the Pauper Lunatic Asylum, at Colney Hatch, Middlesex.—For particulars, apply to Mr JOHN ATTFIELD, Surveyor, Whetstone, Middlesex.

BLUNDELL'S BUILDERS' SQUARE. —This instrument will be found of great service to the Architect, the Surveyor, and the Builder; it is simply a spirit level of very novel construction, and which, without any calculation or adjustment, shews the angle of slope of any surface upon which it is placed; in laying water courses, or fixing beams of wood, either in an horizontal position or to a given slope, it will be found invaluable.—See "The Builder," May 6, and also June 10.—WILLIAM BISHOP and CO., 66, Cheapside, London.

MESSRS. WOOD & Co., DECORATIVE ARTISTS, SIGN and GLASS WRITERS, GRAINERS, HOUSE PAINTERS, and GENERAL CONTRACTORS for REPAIRS, &c. &c.

70, York-road, Lambeth; and 28, Cross-street, Blackfriars-road.

PAPER-HANGINGS, CHEAPEST IN LONDON.—Builders, the Trade, and Country Dealers, may select from a Stock of 20,000 Pieces, of the newest designs, French and English. Bedrooms, 4d. per yard; Satins, 3d. per yard; Flocks, 6d. per yard. Patterns for approval sent in town or country; and Goods forwarded free of expense. A large discount allowed on taking a quantity. Panel decorations, flowers, or oaks remarkably cheap. Terms, cash. Established twenty years. W. CROSBY, 22, Lowther Arcade, Charing Cross.

PAPER-HANGINGS, MANUFACTURED UNDER HER MAJESTY'S ROYAL LETTERS PATENT.

E. T. ARCHER, 451, Oxford-street, solicits an inspection of the various DECORATIVE PAPERS, fitted up in panels on the walls of the extensive range of apartments, built expressly for that purpose; where also is kept an extensive stock of every variety of Paper-hangings, at the lowest possible price and of the best manufacture, in English and French Designs, by the best Artists; and where may be had a large assortment of French and other Continental Paper-hangings always on hand.—Builders and large Consumers are particularly invited to the above.—451, Oxford-street.

TO ARCHITECTS, ENGINEERS, SURVEYORS, BUILDERS, &c.

M. COON having discovered a New Method of LITHOGRAPHING PLANS of every description, in about half the usual time, and at a considerable less expense, begs to offer his services for that purpose, promising that any orders he may be intrusted with will be promptly attended to. It answers admirably for multiplying Tracings.—Lithographic Printing Office, 15, Cheapside, London.

TO ARCHITECTS.—COMPETITION AND OTHER DRAWINGS.

MR. THOMAS S. BOYS, Member of the New Society of Painters in Water Colours, and author of "The Picturesque Architecture of Paris, Ghent, Rouen, &c." and of "London as it is," offers his services in Tinting Backgrounds, Landscapes, Perspective Views, Interiors, &c. From the long experience he has had in such subjects, he is fully aware of the points essentially necessary to be attended to. Drawings and designs lithographed in a superior manner.—Address, Mr. BOYS, 51, Great Titchfield-street, Oxford-street.

CHEAP ORNAMENTAL GLASS.—I beg to inform my friends and the public, that I have now completed a new ENGINE, and, owing to the facility with which I can execute orders, I am enabled to reduce my former prices considerably. The prices are now from ONE SHILLING PER FOOT SUP., and borders from SIXPENCE PER FOOT RUN. A large quantity of the cheapest patterns always in stock. Embossing and painted work on the most moderate terms.—CHARLES LONG, No. 1, King-street, Baker-street, Portman-square.—Cash only.

WINDOW GLASS.—THOMAS MIL- LINGTON begs to inform the Trade and Consumers that he has a large Stock of Sheet-Glass on hand, which he will supply in 200-feet cases, delivered free in London for 42s. 6d. per case, or cut to size, 3d. per foot.—Address, 87, Bishopsgate-street-without.

WINDOW-GLASS, VARNISH- COLOURS, and PLUMBERS' BRASS-WORK.

THOS. MILLINGTON, 87, Bishopsgate-street Without, London, begs to inform the Trade, and consumers generally, that he is supplying the above articles of the best materials and upon the lowest terms for cash.

CROWN, SHEET, and PLATE GLASS, in any quantity; VARNISH: fine Oak or Wainscot, 10s; Carriage, 12s per gallon; White Lead, 27s., and Colours and Brushes; Water Closets complete, 20s; Lifting Pumps and Cocks of every description.

Milk Pans; Propanding, Bee, and Cucumber Glasses; Paper-hangings from 1s. per piece upwards, of very superior description.

GREAT REDUCTION IN THE PRICE OF PLATE-GLASS.

THE UNION PLATE-GLASS COM- PANY.—Pocket-nook, 84, Helen's; 69, Hatton-garden, London; No. 13, York-street, Mosley-street, Manchester; and 26, North John-street, Liverpool; inform Builders and the public generally, that they are now selling ordinary glazing sizes of plate glass from 2s. to 3s. per foot, and smaller plates suitable for cottages, greenhouses, and conservatories, at 6d. to 1s. per foot.—RICHARD YATES, Secretary.

UNION PLATE-GLASS COMPANY.— Architects, Builders and the Trade generally are solicited to inspect the quality, colour and substance manufactured by this Company. To encourage the use of Plate Glass for glazing, a further reduction in price has taken place on the quality used for the purpose.

ROUGH PLATE GLASS supplied ¼, 2-3, ½, and ¾ inch thick. Particular attention is requested to the superior colour and evenness of this article.

LONDON WAREHOUSE, 99, Hatton Garden, Holborn.
H. CHRISTIE, Agent.

STAINED GLASS.—To the Clergy and Architects.—Mr. WILMSHURST begs to inform the Clergy, Architects, &c., that he has opened a room containing a variety of specimens of PAINTED GLASS, suitable for Gothic Church decoration, viz., subjects, single figures of the Evangelists, and other Saints (some having canopies and pedestals), with numerous emblems; and examples of Windows, suitable for churches of various periods of architecture; also, specimens of Illuminated Tablets.

Mr. WILMSHURST solicits the inspection of the above by all interested in church embellishment at his residence, No. 13, Foley-place, Langham-place.

IMPORTANT TO THE BUILDING WORLD.

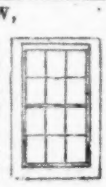
G. HILL, No. 8, Queen's-row, Pentonville- hill, continues to manufacture SASHES and FRAMES and DOORS for the Trade. 1¼-inch Ovolo Sashes and Frames, at 8d. per foot; super 2-inch ditto, at 10d. 1¼-inch 4-panel Doors, at 6d. per foot; 2-inch ditto, at 7½d. All other Joiners' work in proportion. A large assortment of Sashes and Doors always on hand. Glazed goods securely packed.

*** Country orders punctually attended to.

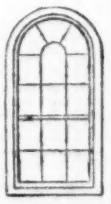
CHAS. WM. WATERLOW,

MANUFACTURER

of Sashes and Frames, and Joiner to the Trade, 121, Bunhill-row, Finsbury-square.—Well-seasoned materials, superior workmanship, lowest prices.—Upwards of 400 DOORS, and a large variety of Sashes and Frames, always on sale. Glazed goods securely packed for the country. Steam-struck Mouldings in any quantity.—N.B. This Establishment is worth the notice of all engaged in building.



SHOP FRONTS, SASHES AND FRAMES, DOORS, &c. MADE FOR THE TRADE.



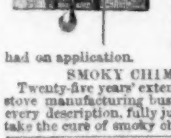
JOHNSON and PASK,
1, Amwell-street, Clerkenwell, near the New River Head,

Beg to inform the Trade, and the Building Public in general, that they continue to manufacture Sashes and Frames, Shop Fronts, Doors, and all other kinds of Joiners' work, on the lowest possible scale of prices. All kinds of Wainscot and Mahogany work done in the very best manner; French polished, and carefully packed for the country.—A full list of prices forwarded by return of post, to any part of the country.

By Her Majesty's Royal Letters Patent.

GLASS VENTILATORS FOR WINDOWS.

BAILLIE'S Patent Transparent Slide Valve VENTILATORS, supplied at a reduction of 40 per cent. from the original Tariff. Their extensive and successful application to public offices, bed-rooms, and the cure of smokey chimneys, prove their great utility. Coloured Glass of every tint at wholesale prices.—Designs and estimates for church and ornamental windows forwarded on application to EDWARD BAILLIE, Glass Painter, Stainer, and Embosser, 12a, Cumberland Market, Regent's-park, London, where specimens are to be seen.



DR. ARNOTT'S CHIM- NEY VENTILATOR.

F. EDWARDS, Stove Maker to her Majesty, 20, Poland-street, Oxford-street, begs to call the attention of Architects, Builders, Gas-fitters and the Public, to the truly invaluable advantages to be derived from the use of Dr. Arnott's Valve for the Ventilation of Rooms of every description.

Prices from 7s. 6d. to 20s. each. A prospectus, containing full particulars, to be had on application.

SMOKY CHIMNEYS—NO CURE, NO PAY.

Twenty-five years' extensive experience in all the branches of a stove manufacturing business, and the cure of smoky chimneys of every description, fully justifies F. E. in stating that he can undertake the cure of smoky chimneys on the above equitable terms.

VENTILATION.—FAIRS' PATENT TRANSPARENT VENTILATORS.—The progressive increase in the use of this invention during several years' trial, in which it has had to contend with many imitations, encourages the Proprietors to recommend it with confidence to the Public generally, and to the Building Trade in particular, to whom they are now enabled to offer greater inducements for its adoption. For the CURE of SMOKY CHIMNEYS, and the thorough, but safe and agreeable, Ventilation of Apartments, Offices, &c., this invention is unequalled; and its general adoption in the Royal Palaces, the Public Offices, Banking-houses, Insurance Offices, and in the dining-rooms and other apartments in the houses of the nobility and gentry, are sufficient evidence of its efficacy.

Orders received by FAIRS and Co., No. 139, New Bond-street; BUNNETT and CORPE, No. 26, Lombard-street; and at the Manufactory, 15, Gillingham-street, Pimlico.

N.B. Ornamental Zinc Sashes and Casements for Gothic Windows, Stained Glass, &c.

TO THE BUILDING PUBLIC.

FIRST-RATE ORNAMENTS in ROMAN and other CEMENTS, and PLASTER of PARIS, at reasonable prices, consisting of Vases, Ballusters, Capitals, perforated Panellings, Cantilevers, Brackets, Trusses, Wreaths, Scrolls Masques, Heads, Figures, Friezes, Gothic and other Chimney-Shafts, Soffits, Bed-moulds, Paterae, &c., &c., 36-inch Centre, Flowers fixed complete, 21s. each, smaller in proportion. An assortment of Shop-front Trusses always ready for fixing.—JOHN HERBERT and SON, Modellers, &c., 42, Parker-street, Drury-lane.

ATKINSON'S CEMENT.—WILLIAM WOOD, Jun., Manufacturer of Roman, Portland, and Bath Cement, Blue Lias Lime Works, CHURCH STREET, ROTHERHITHE, Sole Consignee for Atkinson's Cement.—Grey Stone Lime Depôt. Cement Chimney-pots of every pattern.

KEENE'S PATENT MARBLE CEMENT forms an exceedingly hard and indestructible Stucco, which may either be prepared for paint, or finished in imitation of stone, by the addition of Portland or other stone dust.

It is a cheap and efficient substitute in place of wood for skirting, architrave, and other mouldings, in its application for which purposes it checks the progress of Fire and the attacks of Vermin.

Patentees and sole Manufacturers, J. B. WHITE and SONS, Millbank-street, Westminster, and Seel-street, Liverpool.

PORTLAND CEMENT.—Testimonials received from all quarters prove this CEMENT to possess the rare property of withstanding the severest frost, and to be consequently superior to every other for hydraulic purposes—such as the Building and Lining of Reservoirs, Cisterns, Baths, Fishponds, &c. For External Plastering and Ornamental Castings, it requires neither Colour nor Paint; it never vegetates, and will carry from three to four times its own body of sand.

Manufacturers, J. B. WHITE and SONS, Millbank-street, Westminster.

PORTLAND CEMENT, solely Manufac- tured by W. ASPDIN, Son of the Patentee. This Cement has been proved, for upwards of twenty years in the Thames Tunnel, to resist the action of water; it is stronger in its cementitious qualities, harder, and more durable than any other description of Cement; it does not vegetate, oxydate, or turn green; nor is it affected by any atmospheric influence whatever, the climate resisting alike the action of frost and heat. It is manufactured to set in from five to sixty minutes. For all purposes that Cement is applicable the Proprietors challenge competition.—Orders received by Messrs. ROBINS, ASPDIN and Company, at their Manufactory, Northfleet, Kent, and their Wharf, Great Scotland-yard, Whitehall.

PATENT PORTLAND CEMENT.—To ENGINEERS, ARCHITECTS, SURVEYORS, and BUILDERS.—Messrs. ROBINS, ASPDIN, and Co., are preparing at their Wharf, Great Scotland-yard, Whitehall, a course of experiments to test the adhesive power and strength of their Portland Cement, as compared with Cements of every description, manufactured by any other parties, and for the satisfaction of the building trade, they hereby invite all Cement Manufacturers to compete with them, either at their Wharf, or any other place to be agreed upon, pledging themselves to establish the great superiority of their cement over all others. R. A., and Co., will announce in "The Builder" and other papers, the time of trial to afford the opportunity of Engineers, Architects, Surveyors, and Builders being present thereat.

REMOVED FROM 5, MAIDEN-LANE, TO 22, STEEL-YARD, UPPER THAMES-STREET.

To ARCHITECTS, ENGINEERS, BUILDERS, Masons, Plasterers, and Painters, Merchants, Shippers, and the Public in general.

JOHNS and CO.'S PATENT STUCCO CEMENT, for outside Plastering—perfectly resembles Stone—utterly resists Wet—does not discolour by Damp—wants no Paint—never cracks or blisters—adheres to any substance without previous preparation—is not affected by Frost or Heat—may be exported to every Climate—it improves by Age—it is the only Cement that is a prompt and perfect remedy for internal Damp Walls—it is very cheap, and very easily worked.

Where also may be obtained,

JOHNS and CO.'S PATENT STONE COLOUR STUCCO PAINT, expressly for Painting over Exteriors of Houses that have been covered with Roman or other Cements, and which have become discoloured. This PAINT having an affinity for Stucco, binds itself with it, stopping the suction, thereby rendering the Wall proof against Weather, and in the finish producing a pure stone-like effect, producable by no other Paint whatever. It is cheap, and may be used by any Painter in any climate, even in the most exposed marine situations.—Specimens may be seen, and a Prospectus fully describing the Cement and its mode of application, may be had of Johns and Co., at 22, Steel-yard; or the Manufactory, Plymouth.

MARTIN'S FIRE-PROOF AND ORNAMENTAL CEMENT.

CAUTION.—Messrs. STEVENS and SON Patentees, beg to caution their friends and the trade generally against confounding this invaluable Cement with others, erroneously said to be of the same description. S. and S. pledge themselves that MARTIN'S CEMENT is totally dissimilar in composition and manufacture from every other, and being a neutral compound, is not only free from chemical agency upon any substance with which it may come in contact, but completely resists the action of the strongest acids. They feel it a duty to direct attention to the following properties, which it exclusively possesses:—

1. It rapidly acquires the hardness of stone.
2. Unlike other internal cements, its hardness is uniform throughout its entire thickness.
3. Its surface (which may be made equal to that of the finest marble) NEVER THROWS OUT ANY SALT, and will receive paint in four days, without peeling, when put upon dry work.

It is peculiarly adapted as an internal stucco for walls, skirtings, architraves, mouldings, and enrichments of all kinds, to all of which purposes it has been extensively applied by Mr. Thomas Cubitt, on the Grosvenor estate, &c.

For the above purposes, it possesses great advantages over woods, being more economical and durable, resisting fire, damp, and vermin.

For the floors of halls and fire-proof warehouses, its lightness, durability, and uniform surface give it an immense advantage over stone, being, at the same time, much more economical. The most satisfactory references can be given. To be had of the Patentees, Plaster of Paris and Cement Manufacturers, 186, DRURY LANE.

Agent for Liverpool and Manchester, Mr. R. PART, 28, Canning-place, Liverpool.

BOARD'S PORTLAND, BATH, and IMPROVED ROMAN CEMENT, Dunball, near Bridgwater.—The Proprietor of these Works begs to inform the public that he is now enabled to supply them with an unlimited quantity of the above Cements, and that the Bath and Portland will be found to resemble these celebrated stones both in colour and durability. They are recommended as being superior to all others, for the following reasons:—Being made of Inland Stone (and not dredged from the sea as stone for Roman is), they are not impregnated with salt, therefore never vegetate or turn green (a fault so generally complained of with Roman), they take a much larger quantity of sand than other Cement, never crack, blister, or peel off, and will be found even preferable to stone. They are perfectly Hydraulic, and will set under water in a few minutes; as an external Stucco they are impervious to all kinds of water, and not affected by frost or heat; they improve both in texture and durability, and require neither paint nor colour to make them resemble the best Bath and Portland stone, no other mixture being required than common sand. When used as an internal Stucco for walls, staircases, passages, &c., the Bath and Portland Cements may (if required) be trowelled up to a face almost equal to marble, or may be painted or papered on in a few days. The IMPROVED ROMAN CEMENT is made of the same kind of material, and will be found to posses all the qualities of Bath and Portland (except that of colour); it is cheaper, and in every respect better, than any previously offered to the public, and only requires one trial to be appreciated.

A stock of those Cements, as well as Blue Lias Lime ground for concrete, always on hand, which may be had at BOARD'S Depôt Stone-yard, Paddington Station, and of the following Agents—viz., Mr. R. Creft, Surrey-street, Kent-square, Liverpool; Mr. Baker, 78, Digbeth, Birmingham; Mr. Furze, Hotwells-road, Bristol; Messrs. Tothill and Co., Temple Backs, Bristol; Mr. W. Davey, Quay, Bath; Mr. Grimsly, Oxford; Messrs. Clarkes, Reading; Mr. Thos. George, Windsor; Mr. Hurniman, Taunton; Mr. Tuckett, Exeter; Messrs. Browne's and Co., Bridgwater; Messrs. Southam and Evans, Gloucester.